

# AMERICAN JOURNAL OF INSANITY

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## INTRODUCTION.

The following pages mean to be a lasting record of the spoken words which formed an intrinsic part of the celebration of the opening of the Henry Phipps Psychiatric Clinic of Johns Hopkins Hospital, Baltimore, Md. For the first time in English-speaking countries a university and a large general hospital serving a medical school received as a not merely affiliated but an intrinsic part of its facilities a well-equipped hospital to take care of patients with mental disorders. For the first time a university and a general hospital and its medical school were able to bring to fruition the dream of a great philanthropist and of many workers, a dream, to use the words of Mr. Phipps, that has had for its object the ameliorative treatment of the insane. While Michigan and Massachusetts had created similar opportunities of work, the generous gift of Mr. Phipps put within the reach of Johns Hopkins University and Johns Hopkins Hospital a unique opportunity the inauguration of which deserved an unusual celebration.

Mr. Phipps made it possible to give the American workers in psychiatry an opportunity to meet a number of European leaders of psychiatry, and to arrange for a series of lectures and demonstrations depicting the present status of psychiatry. Those responsible for the arrangements were fortunate in obtaining for the semi-public opening ceremony the cooperation of the men who had had most to do with making possible this new great step, Sir William Osler, who in his farewell address on leaving Johns Hopkins University, had sketched the need of the university and medical school and the hospital in the direction of psychiatry and the care of patients with mental disorders; Dr. Stewart Paton, who in the later nineties and the early years of the 20th century has done

so much to interest the men at Johns Hopkins in psychiatry and in the German clinics, and Dr. William H. Welch, who had suggested this specific need to the inquiring mind of Mr. Phipps, and Judge Henry D. Harlan, the President of the Board of Trustees of The Johns Hopkins Hospital. A gathering of over one thousand persons representing the medical profession, the university, and the friends of the hospital and university listened to the invocation of the Rev. Rufus M. Jones, of Haverford College, Pa., and the brief historical sketch of the inception of the clinic by Dr. William H. Welch, and an excellent statement of the meaning of the clinic by Dr. Stewart Paton, the words of appreciation of Judge Henry D. Harlan, the few but heartfelt remarks of Mr. Phipps, and the fascinating address by Sir William Osler. In the evening of the first day the citizens of Baltimore extended a dinner to Mr. Henry Phipps and to the guests of the celebration. For the strictly scientific part of the program each participant had been invited to choose as far as possible a specific topic in the center of his research interests with a brief statement of the methods and results, and a discussion of the relation which it seemed to have to his conception of the further development of psychiatry. It was thought best to go in medias res with some concrete problem and to show the relations to the wider program of work for which we all were accustomed to look to the special worker as his characteristic field, and also to the wider fields of psychiatry as each investigator sees it. It is with deep gratitude that we present here the contributions of the guests who honored us with their presence.

May this commemoration volume be not only an expression of the present status of psychiatry, or at least of some of its leading movements, but a lasting stimulus towards concrete work and towards untiring efforts to reach the aims of the donor of the great opportunities.

ADOLF MEYER.

## A WORD OF APPRECIATION.\*

By HENRY D. HARLAN,

*President Trustees, The Johns Hopkins Hospital.*

We are standing at the threshold of a new era for the Johns Hopkins Hospital and the Johns Hopkins University. However glorious the past has been, we look for the coming era to be one of wider influence and larger progress. We have met to receive from its donor, to open and dedicate to the service of humanity, a great building designed by its gifted architect, to translate into bricks and mortar, wood and stone, marble and steel, the most modern scientific theory of the environment in which those afflicted with mental ills should receive care, planned with the most assiduous attention to detail, provided with every facility, every appliance, every device that human forethought and present knowledge can suggest, thoroughly furnished and completely equipped, and in which no reasonable expense has been spared, to provide the means and the opportunity for the advanced study and treatment of mental disorders and for the higher education and training of medical men, students and nurses, in this most important specialty.

This Clinic, intended, in the words of its founder, for "the better care of patients suffering from mental diseases, especially in the earlier and often curable stage, under conditions similar to those of a general hospital"—with accommodations for an hundred patients, and for a medical staff sufficient to study all cases presented, with its large laboratories for psychology, neuropathology and clinical microscopy as aids to investigation, with its capacity for teaching, with its dispensary or out-patient department for the thorough study of incipient cases in their homes and supervision of home conditions, with its provision for an ample social service to give after-care and skilled supervision of discharged patients, with its unusual facilities for the systematic classification of patients, and for the treatment of acute mental trouble by hydrotherapy, mechanotherapy and continuous baths,

\* Address delivered at the opening exercises of the Henry Phipps Psychiatric Clinic, The Johns Hopkins Hospital, Baltimore, Md., April 16-18, 1913.

with its careful arrangements for recreations, occupations, amusements, industries and music for convalescents—this splendid and costly edifice—with all that it is, with all that it represents, with all that it contains, and with a fund to maintain it during a period of years sufficient to demonstrate its value, is the gift of one modest, thoughtful, generous, sympathetic, far-seeing man, Mr. Henry Phipps of New York.

It is a magnificent gift, magnificent in its conception, magnificent in its size and magnificent in its potentiality for good. It is a gift to the Johns Hopkins Hospital, but it is accompanied by a gift to the Johns Hopkins University, for, coupled with the gift of the psychiatric clinic to the hospital, there is a gift of a professorship of psychiatry to the Johns Hopkins University.

Mr. Phipps shall tell you in his own words why he made these donations. In a letter to the trustees, under date of July 14, 1908, he wrote: "In the short period of its existence—not yet twenty years—the Johns Hopkins Hospital has influenced profoundly every department of the medical profession, and has introduced new standards and new ideals.

It is a tribute to these and to the men who have carried them out that I establish this new foundation, in the strong hope that in it work of the same high character for the country at large may be done." . . .

These words are worthy of preservation among our most priceless possessions as long as we continue to deserve them.

That Mr. Phipps, a citizen of another state, should have made these Maryland foundations the recipients of such bounty and selected them as instrumentalities through which the beneficent plan that had found a lodgement in his mind for the good of mankind, should be wrought out, fills us all with the most profound appreciation and the warmest gratitude. No higher tribute could have been paid to the character of the work which has been accomplished here by those who have engaged in the search for truth, in the advancement of knowledge and the spread of learning, and no greater stimulus or encouragement could have been afforded to the workers in every department of our hospital and university.

Our gratitude, deep as it is, is not a mere personal sentiment. It is the gratitude of those who recognize, both the significance of

this gift, and the obligation it imposes. A new field of research and endeavor, promising results of supreme importance, has been opened to our staff and students. A great opportunity is present. The problem of administering this great clinic, of directing its activities, of making it accomplish the objects for which it was designed, is before us. We do not minimize the responsibility of undertaking it, but believing as we must, that the noble impulse which was born in the heart of Mr. Phipps, and has found such expression, was divinely inspired and will be divinely blessed, we enter upon it with resolute purpose, and we confidently hope, that with the aid of the distinguished director who has been chosen and his accomplished assistants, and the cooperation and help of a medical board that has never failed us, there may here be achieved all and more than, even you, sir, have anticipated, so that not only may many who enter these walls, facing the darkness and gloom of blighted lives, leave them with hope revived, reason restored and happiness renewed, but also that what is done and taught and learned here, may so advance the science of psychiatry, that countless others everywhere may be blessed and benefitted.

Mr. Phipps we accept the great building, which you have turned over to us to-day. We cannot thank you sufficiently for the confidence you have reposed in us, but we are deeply sensible of it and of your liberality, and we trust sir, that your life may be prolonged many years, during which you may enjoy the rare felicity of beholding some of the benefits to humanity that are to flow from your generosity.

The name of Henry Phipps will have a high place among the benefactors of Baltimore, and like that of Johns Hopkins will be remembered with gratitude by unnumbered generations after most of ours are long forgotten.



## THE PSYCHIATRIC CLINIC AND THE COMMUNITY.\*

By STEWART PATON, M. D.,

*Lecturer on Biology at Princeton University,*

*Director of the Mental Hygiene Exhibit of the National Committee for Mental Hygiene.*

The increasing interest shown in the study of human activities is one of the most significant and hopeful signs of our times. Momentous as was the impulse given to science by Copernicus, Galileo and Newton one result of their investigations was to direct attention to a universe in which human beings were considered to be merely passive observers of natural phenomena. So absorbed did man become in formulating hypotheses to explain a theoretical universe of which he did not form a part, and in delving into the records of his own past history, he neglected the study of present activities. At last the course of events warned him that the lessons of remembrance or the hypertrophied historical sense had become "a malady from which men suffer."

The dedication of a psychiatric clinic is an event of more than ordinary importance to a community, as it marks the awakening of intelligent interest in man, as an active thinking being. Having striven for centuries to improve the methods for recording his fanaticisms, superstitions, sins of omission and of commission, and failures to adjust life to meet new conditions, he has begun at last to take rational measures to improve his lot, and to acquaint himself with the laws on which the social organism rests. As the value of this benefaction to the community will depend directly upon the intelligent use of resources and energy made available for rendering more effective service to humanity, may we not profitably devote a few moments in attempting to formulate some of the problems to the solution of which this clinic is dedicated. Errors in judgment committed now, in estimating the scope and the character of the investigations to be carried on in this building, might defeat the efforts of those upon whom the

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responsibility of equalizing opportunity and achievement must fall.

This clinic, in a peculiarly distinctive manner, typifies the human as well as the humane spirit of the twentieth century. During the seventeenth and eighteenth centuries the physical sciences had succeeded in breaking away from the traditions and superstitions which had hampered their development. Astronomy had been divorced from astrology, chemistry from alchemy, and the foundations of geology had actually been laid. In the nineteenth century the renaissance of the biological sciences was accompanied by the formulation and expression of a rational idea of man's position in cosmos. Towards the close of the eighteenth and the beginning of the nineteenth century a few investigators had already called attention to the importance of studying the activities of human beings; but not until the second half of the last century was there any realization of the fact that the most interesting phenomena of the universe for human beings to study were their own activities. How do we live, move and have our being?

To the lay mind the term psychiatry often suggests a very limited field in medical science, but those who take an active part in the work of this clinic will easily appreciate that they are engaged in attempting to find the solution of problems of far greater importance than any relating merely to the care of patients suffering from mental and nervous disorder. Anomalies of thought and conduct are studied in order that the knowledge acquired may be applied directly to making life for the majority of persons pleasanter and more effective. Institutions of this character are intended primarily for the study of human nature along broad biological lines.

We are justified in considering disease as an analytical process which reduces to a comprehensive form the complex activities we designate collectively as health. An intimate knowledge of abnormal states of mind and body is, as Pinel affirmed, a key that unlocks the secrets of human history. By making use of nature's contrast of functions we may also gain an insight into that continuous process of adjustment we call life. From the study of disease the facts have been gathered for the foundations upon which modern preventive medicine has been established, and

through it a new meaning has been given to life and greater efficiency in thought and action to those who profit by the lessons of science. For centuries the different parts of the body have been studied by physicians, and a knowledge of the structure and function of the separate parts has been attained. It is essential, if we are to comprehend the fundamental mechanisms of response of the organism, that we familiarize ourselves with the laws which govern the relationship of all these organs as they are expressed in each individual, and we must accustom ourselves to study man as a living organism.

Living beings have the capacity of expressing their integral unity as individuals, and in the case of man there are special mechanisms of adjustment, collectively designated as the personality. The complex adjustments synthesized in the personality may easily be deranged by interference with the activities of organs or by disturbing the capacity for adaptation; the chief function of sense organs, brain and nervous system. We all know how intimately dependent human beings are upon their environment. Changes in the latter call for delicate and immediate adaptation, and it may be said the problems of psychiatry relate to the determination of the causes which give rise to imperfect adjustments.

A great blessing was conferred by science upon humanity when the problems of psychiatry were restated in biological terms. Life was recognized as a process of adjustment, relatively perfect in health and imperfect in disease; while that metaphysical term insanity arbitrarily reserved to designate certain forms of unsuccessful adjustment was cast into the rubbish-heap together with the chains, straight-jackets and hand-cuffs which had long tortured the lives of patients. Out of hazy mystical conceptions entertained in regard to the nature and genesis of activities described as thought and conduct sprang new ideas potent to inspire the minds of investigators, capable not only of bringing about great practical reforms in the care of the insane, but also in improving the methods for attacking the problems relating to human thought and conduct.

As the ultimate success of the work to be carried on in this clinic, more than in any other department of the hospital, will depend upon cooperative endeavor, I may be permitted to em-

phasize what seems to me to be an important factor in organization and administration. The patients presenting themselves for treatment are subjects of imperfect adjustments in the life process. The time during which they remain under observation in these wards will represent relatively brief epochs of life, and the records of cases will often give but cursory glimpses into the genesis, duration and progress of imperfect life adaptations. In order to serve the high purpose for which it is planned and dedicated this clinic should be regarded as an important link in a chain of agencies, home, school, college, other hospitals and institutions; in fact the entire social organization with which it is essential constant sympathetic contact should be maintained. Only by the establishment of these relationships can progress in the study of life processes be made.

May we express the hope that in attempting to estimate the value of the work accomplished in this clinic the public expression of opinion should be tempered by charity and patience. Although the field of investigation, which includes the consideration of the factors determining human thought and conduct, is the most interesting one in modern medicine, let us not forget that it is the last one to be thrown open to investigators.

The methods of investigation necessarily employed will not appeal to the imagination of the public. The inspiration essential to solve the problems of modern psychiatry will probably not flash into consciousness as did the visions that guided the observer watching the lamps swing in the cathedral or the apple fall from the tree, but it will come gradually only after patient quiet effort, similar to that which finally rewarded the author of "The Origin of Species," and gave a new meaning to life. The realization of the ideals to which we do homage to-day will mark the time when, in Goethe's words,

Vernunft fängt wieder an zu sprechen,  
Und Hoffnung wieder an zu blühn.

## SPECIALISM IN THE GENERAL HOSPITAL.\*

By SIR WILLIAM OSLER, BART.,

*Regius Professor of Medicine, Oxford; Honorary Professor of Medicine,  
The Johns Hopkins University.*

It is not easy to put in words my appreciation of the honor of delivering one of the formal addresses at the opening of this institute or to express my gratification at the inauguration of this new development in the Johns Hopkins Medical School. The pleasure is heightened by the thought that the generosity of an old and valued friend has made to-day possible. This hospital has already experienced the wise liberality of Mr. Henry Phipps, one of whose tuberculosis foundations, under its management, ranks as a model of its kind.

That, after nearly a quarter of a century, all those professionally concerned in the early working of the hospital are here to take part in this ceremony, is, for us at least, a happy circumstance. One man I should like to have seen with us, Francis T. King, the first president of the hospital, whose devotion to its interest and whose faith in its future were the stay and support of his declining years. Three of those closely connected with the early organization have passed away. Dr. John S. Billings was, from the first, the adviser of the board of trustees, the real designer of the hospital, and the friend to whom we all turned for advice. I know with what satisfaction he looked back on this part of a life great in achievements for the public and the profession.

No one of all that fine band of men with whom we were associated, Judge Dobbin, Judge Gwinn, Mr. Francis White, Mr. Lewis Hopkins, Mr. W. T. Dixon, Mr. G. W. Corner, Dr. Cary Thomas, Dr. Alan Smith, Judge Brown, Mr. James Cary, Mr. Joseph Elliott, Mr. C. Morton Stewart, would have appreciated to-day more keenly than Daniel C. Gilman, whose work in connection with the opening of the hospital must never be forgotten. He was a man with rare vision and one also who could drive the

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straight furrow, as the people of this state—of the country at large—well know. And how Isabel Hampton would have rejoiced to see this day—with its great opportunity to develop the special work so dear to her heart. How full of gratitude must be our first director, Dr. Hurd, to see the fruition of many years of strenuous, hopeful toil!

In 1889 this institution seemed to many the last word in hospital construction, and those of us who were fortunate enough to take charge of the departments felt that here was something to be lived up to, something in which our dreams could be realized. Only when in working order did we feel its incompleteness. We had no medical school, a big gap quickly filled by the generosity of Miss Garrett and her friends. Year by year saw new departments added, new lecture rooms, operating rooms, laboratories, additions to the out-patient departments, to the Nurses' Home, and, by Mr. Marburg to the private wards; and hand in hand, an internal growth in efficiency, and an ever-widening sphere of influence, educational and philanthropic. Our ambition was to do for medicine what Mr. Gilman and his faculties of the university were doing in art and science, and at a pace hard to follow. The race was not an easy one, but fortunately there were close bonds between the two training stables, and we had the advantage of the prestige of their 13 years of brilliant success.

Only a few impressions of life endure. We use the same cylinders over and over again, the dots and markings become confused, and when we call for a record, a jumbled medley is poured out, a confused message from the past. But certain records are time-fast, and bite in such a way that no subsequent impressions can blur the clearness, and the story comes out fresh and sharp. So it is when I call up those early years so full of happiness, so full of hope. And to have seen in so many ways the fulfillment of our heart's desire is more than we could have expected, more indeed than we deserved.

I am sorry for you young men of this generation. You will do great things, you will have great victories, and, standing on our shoulders you will see far, but you can never have our sensations. To have lived through a revolution, to have seen a new birth of science, a new dispensation of health; reorganized medical schools, remodeled hospitals, a new outlook for humanity, is not given to every generation.

By temperament a dreamer, wherever I have worked, visions of the future have beset me, sometimes to my comfort, more often to my despair. In desolate days I have wandered with Don Quixote, tilting at windmills; in happier ones I have had the rare good fortune to dream dreams through the gate of horn, and to see their realization, to have both the vision from Pisgah and the crossing the Jordan. I have seen the school in which I began in Toronto, in an old building, dirty beyond belief, transformed into one of the most flourishing on the continent, a staff of seven teachers increased sevenfold; my alma mater, McGill, prosperous even then in men of mettle, but housed in wretched quarters, now in palatial buildings, and in affiliation with two of the best equipped of modern hospitals. How paltry were my aspirations of those days! How insignificant do they seem. My feelings when Sir Donald Smith, now Lord Strathcona, gave us the first endowment of \$50,000, could not be stirred to the same intensity to-day by less than a million! Nearly 30 years have passed since I joined the University of Pennsylvania, the premier school of the country. There were new buildings, and a new hospital grouped about a single arts building. But what a transformation since! Whole squares of West Philadelphia annexed and covered with laboratories, dormitories and lecture halls and largely due to the magic energy of a prince of dreamers, William Pepper.

It has been my lot to see others do what I should have liked to do myself, and to feel that it has been better done! Looking back over a somewhat vagrant career, my fission from an academic body has always been a stimulus, and has invariably quickened the pace of progress. And this thought was a consolation when I left this comfortable billet, a few years ago. Among the scanty seeds scattered in my peaceful valedictory only those in which I ventured into the dangerous region of prophecy appear to have fallen on good ground.

I spoke of the needs of special departments—hoping that within 25 years we should have a psychiatric institute, a children's hospital, a genito-urinary clinic and a special building for diseases of the eye, ear and throat. Two of these are already accomplished facts—the Harriet Lane Johnston Children's Department has been opened; to-day we open the Phipps Psychiatric Institute, and for the new genito-urinary clinic, that money has been fur-

nished through the liberality of Mr. James Buchanan Brady. Others will follow rapidly, and it is safe to say that within a dozen years there will be as many special departments, semi-independent units in a great organization. The occasion seems fitted for the expression of a few thoughts on specialism in the general hospital.

The work of the units is identical; each a place where rich and poor receive the best skilled help that the profession can command; each a place where students are taught; each a center of study and research. Let us consider briefly these three functions. Similar in diversity, each unit in organization, in aims, and in methods, is a replica of the other. Each represents a technical school linked to the university by the medical faculty of which, by Mr. Hopkins' will, this hospital was to form a part. They differ from the more purely scientific departments of the medical school in one important particular. The hospital units mint, for current use in the community, the gold wrought by the miners of science. This is their first function.

A mother to-day brings her child to Dr. Harry Thomas, at the neurological department, a poor dwarfed, idiotic creature, but all the same very dear to her heart. It is a far cry from the little laboratory where Schiff made his immortal experiments, and literally thousands of workers in the mines of science have slaved years to find the pure gold, handed out freely from this hospital to that poor woman, with which salvation was wrought for her poor child. It seems so easy now. "Ah, a cretin. How interesting! How old do you say? Eight? Why, she looks three. All right, do not worry, the child will get well quick; get these powders. Yes, three times a day!"

An anxious mother, whose son goes to Manila next week, brings him to Dr. Barker in the private ward for an anti-typhoid inoculation. Again a far cry from Zurich, where Klebs—so often a pioneer—first saw the typhoid bacillus. Again, a host of miners and a vast store of gold—golden knowledge, with which, would they but use it, people of the country could redeem from certain death thousands of their sons and daughters.

The two incidents I have mentioned illustrate what is going on in every unit of a hospital to-day. Take another—that street brawl last night. "Yes, he was shot through the abdomen." "A dozen wounds in the bowels, you say? Hum! What a job! Must have

taken you a long time—doing well, of course." "Oh, yes, we got him early—they all do well now!" Who would have believed such a story in my student days? Again, the pure gold dug out by the elder Gross, Lister, Halsted and thousands of miners, minted in the laboratories and handed out, Mr. President, to the public last night by your surgeons.

We sit over the fire in the evening and pile on the coal without a thought of the dark and dangerous lives of the poor miners who risk so much for so little. It distresses my soul to think that we have done so little for the miners of science, and it does not lessen my distress to know that very often they do not give a thought to us. That coal put on the grate last evening—do you think the Hungarian in West Virginia thought how comfortable you would be over the fire? No! Nor did Schiff realize that his work would be utilized to brighten the hopes of thousands of mothers or that he was following a lode richer for humanity than the Golden Fleece. Only a cold-hearted, apathetic, phlegmatic, batrachian, white-livered generation, with blood congealed in the cold storage of commercialism, could not recognize the enormous debt which we owe to these self-sacrificing miners of science; and yet there are to-day sons of Belial, brothers of Schimei, daughters of Jezebel, direct descendants of the Scribes, Pharisees and hypocrites in the time of Christ, who malign these prophets and wise men, winners in a fight for humanity unparalleled in the annals of the race.

The perfect physical form in man or woman is much more sought than found. The perfect mental form is even more rare. The best to hope for in the average man, from nature and nurture, is to have a right judgment in all things. In how few of us is this consummation reached! One philosopher made the comforting remark that "Every man has a sane spot somewhere." Burton, in his survey of humanity in the famous *Anatomy of Melancholy*, concludes that the whole world is mad, and needs a journey to Anticyra (where the best hellebore, a specific against madness, was grown).

There should be, Mr. President, no lack of candidates for help from the unit we open to-day. Many a man goes to his physician now for an overhauling of his machinery. I found a big West Virginian in the private ward one morning. The history was colorless. I went over him thoroughly. "There is nothing the

matter with you," I said. "I did not say there was," came the reply, "that is what I wanted to know."

We are all a bit sensitive on the subject of our mental health, but a yearly stocktaking of psychic and moral states, under the skilled supervision of Professor Meyer, would be most helpful to most of us.

Mr. J. A. A tendency to irritability of temper.

Mrs. R. Too much given to introspection.

Miss B. Over-anxious about her soul.

Master G. Worried by a neurasthenic mother.

These would be some of the headings in the diagnosis slips. But the Institute will have enough to do—meeting a demand for the early treatment of borderland and acute cases.

The progress in the rational treatment of insanity is a bright chapter in the history of the past century. The story recently told by Dr. Hurd, of the changes in this country within forty years, is full of encouragement. The larger staff, the skilled assistants, the scientific study of the cases has become a rule and this community has had the benefit of the up-to-date methods of the Sheppard-Pratt Hospital, and has seen with pride the rapid development of the work of the state institutions. New methods of treatment will be tested, every advance in technique controlled, and to new theories will be applied the touchstone of science. A wide diffusion of its benefits should take place through the nurses who will pass through the institute. The discreet, even-balanced, thoroughly-trained mental nurse will be a great boon in general practice, and she will have a sociological value amid the widespread activities that have been aroused in connection with mental hygiene.

That the medical student is an essential factor in the life of a great general hospital, has been of slow recognition in this country. Admitted to the dispensaries, welcomed in the amphitheater, he has been, until recently, rigidly excluded from the wards, except as a casual attendant on ward classes. I am glad to say that from the day he leaves the medical school laboratories, he is in this hospital a co-worker with doctors and nurses, in every one of its activities, and as his right, not as a privilege grudgingly granted by the trustees.

And so it should be in all general hospitals. Every unit must be so organized as to make him fit in as part of its machinery. It is his business to know disease, and for the sake of the public, every possible opportunity should be given to him. I would even throw open the private wards, that the clinical clerks and surgical dressers might see the vagaries of sick life in all classes of society. In the palmy days of Rome, the physician was followed to the houses of the wealthy by his pupils—a practice we could emulate in our private wards—limiting, of course, the numbers, and selecting the cases.

But with the medical student there is a real difficulty, expressed 25 centuries ago by the Father of Medicine, in the famous aphorism "Life is short; the art is long." The stay of the medical student in the hospital is so brief, the amount to be learned so vast, that we can only hope to give him two things—method (technique) and such elementary knowledge as how to examine patients, the life history of a few great diseases and the great principles of surgical practice. He cannot be expected in the short period of the curriculum to go the circle of the units, spending time enough in each to master the chief details of a dozen specialties.

In most schools, a system of elective studies has been arranged to meet this really pressing and serious condition, which has grown in acuteness with the multiplication of the specialties. How can an institute like this touch the medical curriculum? At many points, directly and indirectly. The very existence in a general hospital indicates the recognition of psychiatry as part of its legitimate work. One of the tragedies of the subject has been a dissociation from centers of active professional and university life. A department of medicine, with the closest affiliation with the life of the community, has been segregated and stamped with a taboo of a peculiarly offensive character. Here it will take its proper place—a unit in the work of the medical school of a university.

This, in itself, will be a lesson to the student. A new atmosphere will be diffused, a new group of energies and activities will come into the hospital, which cannot but be helpful. The director, his staff, and the nurses will play a new rôle, which will greatly enhance the reputation of the old company. Living as he does in such close fellowship with the staff of the hospital, the medical

student will be influenced in this way by the very presence of the institute.

It is to be hoped too, time may be found for general instruction of the senior class in the elements of neuro-psychology, and with the elective system, an active group of students be found to whom this study will appeal strongly. But after all as practical men, we have to face the Hippocratic aphorism—the art is getting longer and longer, the brain of the medical student, not getting bigger and bigger, has its limits; and though keener and more industrious than ever in history, the time is too short for a man already burdened to the breaking point, to study any specialty from the stand-point of the specialist.

To a large outside body, this institute should cater with extraordinary benefit. There must be a thousand or more assistants in the asylums of the country, whose pineal glands are not yet crystalized, and who should find here inspiration and help. Amid isolated and depressing surroundings, these men do yeomen work in the profession. From the director and his staff, they will receive that warm and encouraging sympathy, the very leaven of life, a quality which has been the inspiration of the benefactions of the founder of this institute. And I hope room and plenty of it will be found for the general practitioner, through whom more than any other group, the benefits of this institute may be distributed. He needs enlightenment, instruction and encouragement—enlightenment as to the vast importance of early deviations from normal mental states, instruction in new methods of diagnosis, and treatment and encouragement to feel that in the great fight for sanity in the community he is the man behind the guns.

A larger outlook is connected with the third function of a hospital unit. The old Greek, with his quick sense of helpfulness, always asked about a work: "Does it make life a better thing?" and Prof. Gilbert Murray remarks that one who wished to give the greatest praise to the Athenians said, "They strove to make gentle the life of the world." The American, the modern Greek—mentally if not orally—always asks the same practical questions; sometimes, in the case of pure science, when it is both foolish and fruitless. But he may ask legitimately how such an institute as this may be helpful in studying lapses and freaks of the human mind—I cannot give the answer. "It is not in the book I learned

out of " as the children say. I could tell you in internal medicine, and could refer you to the long list of studies in dysentery, malaria, typhoid fever, pneumonia, heart diseases and blood diseases that have come from the medical unit. But a psychopathic unit is a novelty in a general hospital, designed for the study as well as for the cure of mental aberrations.

We talk a great deal about the human mind, and, when cornered, quote Hamlet to cover an unpleasant ignorance of its true nature. The modern student, like the ancient, takes his stand either with Plato and compares the mind and brain to a player with his musical instrument, or with Lucretius to a musical box wound up for so many years to play so many tunes. Authorities lean to one or other of these views, and I have a shrewd suspicion that some of our distinguished visitors, great representatives in this specialty, do not see eye to eye in this matter. Three things we do know, departures from normal states are extraordinarily common—they are the most distressing of all human ills—they should be studied systematically by experts, with a view to their prevention and cure.

When Dean Swift left the little wealth he had to found a house for fools and mad, he could not forego the pleasure of adding the satiric touch: "No nation needed it so much." This idea was not, I am sure, in the large heart of Mr. Phipps; but a wide-spread feeling has arisen in this country that the hygiene of the mind is just as important as the hygiene of the body—that we must return to the Greek ideal of the fair mind in the fair body. How beautifully Plato visualizes the day (in a passage I am never tired of quoting)—"When our youth will dwell in a land of health amid fair sights and sounds and receive good in everything; and beauty, the effluence of fair works, shall flow into the eye and ear like a health-giving breeze from a purer region, and insensibly draw the soul from earliest years into likeness and sympathy with the beauty of reason." (Republic, Bk. II.)

What a revelation of an awakening in the community that it was possible to organize such a Congress of Mental Hygiene as was held here a few months ago under the auspices of the Medical-Chirurgical Faculty! The program itself was an inspiration. In this country, to recognize a wide-spread need is to meet it; and such gatherings held under auspices of the National Com-

mittee will go far to lessen the sad prevalence of early nervous breakdown.

What a philosopher said of the Melissians may be said of many people—they are not fools, but they do just the things that fools do, in the matter of training the young. Unfortunately, we cannot pick our parents, and still, as of old, our hearts give our hands, regardless of our heads. Dr. Mott will tell a tragic tale of heredity in relation to insanity. I am afraid several generations must pass before we see any practical results of the present active eugenic crusade, but there is an immense and hopeful work to be done in educating parents in training-stable methods. An Ethiopian cannot change his skin, but a queen bee results from a change of diet. This institute, I am sure, will play its part in this national campaign of prevention of mental ill health through education—a campaign as important to the public, and just as worthy of support as the great struggles against tuberculosis and infant mortality.

It will be helpful too, to study in a sane, sober and sympathetic way, epidemics of mental, moral and even economic folly as they sweep over the country. The present opportunity should not be missed. With causes just as definite as small-pox or yellow-fever, they never occur under exactly the same conditions, but all have their basis in, and are mere specks upon, that fine old humanity that is ever fighting its way towards the light.

The present out-break has not been equaled since the capture of the Roman world by Oriental cults. The same old-fashioned credulity exists that enabled Mithras and Isis, Apolonius and Alexander to flourish then as the new cults do to-day—and for the same good reason. There is still potency in the protoplasm out of which arose in primitive man, magic, religion and medicine. Circe and Æsculapius were probably twins! Historically our fringe of civilization is of yesterday, if we compare the six or seven thousand years of its record with the millions which must have passed since man assumed his present form on the earth. In this vast perspective Aristotle and Darwin are fellow-students; Hippocrates and Virchow are contemporaries.

Primitive views still prevail everywhere of man's relation to the world and to the uncharted region about him. So recent is the control of the forces of nature that even in the most civilized countries man has not yet adjusted himself to the new conditions,

and stands, only half awake, rubbing his eyes, outside of Eden. Still in the thaumaturgic state of mental development, ninety-nine per cent of our fellow creatures, when in trouble, sorrow or sickness, trust to charms, incantations and to the saints. Many a shrine has more followers than Pasteur; many a saint more believers than Lister. Less than 20 years have passed since the last witch was burned in the British Isles!

Mentally the race is still in leading strings, and it has only been in the last brief epoch of its history that Esop and Lewis Carroll have spun yarns for its delight, and Lucian and Voltaire have chastised its follies. In the childhood of the world we cannot expect people yet to put away childish things. These, Mr. President, are some of the hopes which fill our hearts as we think of the future of this new department.

One word of appeal to the units. Members of a corporate body, successful life will depend upon the permeation by harmonics which correlate and control the functions. Isolation means organic inadequacy—each must work in sympathy and in union with the other and all for the benefit of the community—all toward what Bacon calls the lawful goal of the sciences, that human life be endowed with new discoveries and power.



## THE PURPOSE OF THE PSYCHIATRIC CLINIC.

By DR. ADOLF MEYER.

I deem it a great privilege to state before this representative gathering just what the Psychiatric Clinic stands for, and what is made possible through the munificence of Mr. Phipps. Mr. Phipps has repeatedly and in a most practical way given expression to his far-sighted conviction that active investigation should be bestowed on the family scourges of tuberculosis and insanity, instead of accepting them fatalistically. The new clinic I trust will make it easy for us to make a practical demonstration of the wisdom of this big-hearted practical philosopher.

The existing hospitals or asylums for mental disorders have of necessity been too exclusively limited to the care of more or less extreme cases. A declaration of outspoken "insanity" with all its arbitrary implications was long required even for admission, and this barred out many and unhappily stigmatized those who entered. To be sure, even in asylum-care, wonderful strides have been made during the last 25 years, as has been shown in the recent Mental Hygiene Exhibit in this and other cities. In the face of great odds of overcrowding and undermanning and forced economy, they are playing a more and more active and helpful rôle in the community. But now the time and conditions have become ripe for intensive research and for an effective fight for care and prevention. The vigorous appeals of Stewart Paton, the magnetic influence of Dr. Osler and Dr. Welch, and the genius of the leaders of the Johns Hopkins Foundations, who realized that their hospital would do its work best with a medical school and the university, have all together created a unique soil in Baltimore—for an institute representing a true clinic, *i. e.*, a hospital for practical work, research and teaching.

What is vaguely called insanity—a term which physicians would gladly leave to the lawyer if he can use it—is really a wide range of greatly differing conditions and diseases all playing havoc with our organ and functions of conduct and behavior. Many too long neglected lines of research enter into it, and it is only to be hoped

now that the North Pole and the South Pole have been properly discovered that there may be more interest in expeditions exploring the biggest asset and the biggest problem of individual and nation: the brain and its proper working. The last years have opened up wonderful problems and opportunities for progressive work on the function and surgery of the brain, the important and more and more accessible rôle of certain glands regulating formerly mysterious functions; the control of the great scourges of humanity, the germs back of paresis and the actions of poisons; and at last science begins to take up with new and forceful methods the great problem of mental life in its narrower sense, the causes and modifiability of harmful cravings, and of poor mental habits, and the ways and means of helping people of widely different endowment to find their proper sphere. In all these lines the clinic must work, investigate and teach, and gather diligent students and workers around its patients and in its laboratories. But this work does not stop in the sanctum of the investigator. Just as bacteriology studies the water supply and the air and food of communities, schools and homes, so we psychopathologists have to study more effectively the atmosphere of the community and must devise safeguards in the localities from which the patients come, and to which they are to return.

The Johns Hopkins Hospital has always kept its gates wide open, and as far as possible this new division will carry on the best traditions of the hospital. If we can, in part at least, devote ourselves to the close study and care of disorders affecting definite localities and definite conditions and difficulties of life which we may choose as the center of intensive study; if we are not forced to take in cases unless we feel reasonably sure of achieving something definite for the patient and of ourselves progressing towards our goal of better knowledge; if the clinic is not forced to serve mainly as another crowded reception hospital, watching helplessly the endless procession of victims without time for thorough study, our clinic will, of course, be most serviceable. Even the ordinary current work will be at its best when we can study at close range the families and the environment in which the patient became sick, and to which he may have to return; and where we can really reduce the sometimes baffling troubles to intelligible principles of cause and effect, with all the helps of experimental pathology,

therapy, internal medicine, neurology, psychology and sociology. Our patients, their families, the students, and finally a broader public will thus gradually acquire safer ideas than those furnished by tradition, by novels and distorted impressions, a faith not merely in sensational stunts, but in sane methods to prevent or adjust the many ways in which mind can be affected in concrete patients, a working out of safe ways of mental hygiene and sound living for those who need special precautions, and ultimately a wider realization of what makes for the most efficient life for the community at large, and the best policy for our American cities and states.

Our general hospitals aim to create *standards of sanitation*; and a psychiatric clinic must create standards of how to spend a *day* and perhaps *weeks* in a way in which a mind can find itself again if it is at all *possible*. This is why our clinic differs from the average hospital, and why so much stress is laid on possibilities of sane living and social work, beside the direct specific curative work. Above all things we must make it worth while to remedy and adjust *small beginnings of trouble*, which so far have received scarcely any systematic help. We must overcome the aversion to timely treatment created by the unnecessary wholesale declarations of insanity. We must show that the so-called insanities are not so different from so-called nervousness, that even ordinary impediments of our mental efficiency are worth a sensible adjustment, which is clearly valuable and more creditable to patient and family than groping about and shirking the helps available. We must do all in our power to see that physicians and students who see patients in their homes should become thoroughly familiar with and more broadly interested in the simple disorders whether they be harmless or more serious.

Mental difficulties demand a great deal of patient inquiry into the conditions of the body and its functions and the personality and the situations to be met. Consultations and a study of the case in the out-patient department will suffice for some patients; for others a stay in the hospital for more thorough examination and for a start in a new attitude towards life, and for special remedial treatment may be needed. Social work, *i. e.*, a study of the real life of the families is probably needed in most cases. Few families know how to cope with the problems or else many of the disorders would not occur, and this holds for the well-to-do as for the poor.

This clinic does not come to replace or make unnecessary our state and private institutions; nor can it be simply a municipal institution. Yet I trust that Baltimore will derive its full share of unquestionable advantages through the resources of the clinic for individuals, for help and decisions in the work of the schools, of the courts and wherever investigations of mental health and mental hygiene play a rôle.

All this is part of a large medical problem; but also part of the great *civic* problem. Progress in the mental health issue, calls for a great deal of the right balance between individualism and civic solidarity and a far-sighted policy concerning the health problems. If we want to teach *some* people how to live, we *all* must realize that we have to give a chance to each according to his or her aptitude; the right to be *honorable* that which one is forced to be through the laws of nature and endowment, and the right to be stronger as a part of a well-fitted and truly amalgamated social body. Mr. Phipps has given us a wonderful center of mental orthopaedics. With the help of the good will and active collaboration of Baltimore we hope to make it another one of the great departments which may well be a source of pride and an inspiration to every citizen, and a living and productive monument to this great philanthropist, Mr. Henry Phipps.

## THE SOURCES AND DIRECTION OF PSYCHO- PHYSICAL ENERGY.\*

By WM. McDougall, OXFORD, ENG.

When I received an invitation to attend this happy celebration and to address this illustrious assembly, I felt that the leaders of psychiatry in this country had paid through my obscure person a fine compliment to the workers in pure science, had made a handsome acknowledgment of the value of studies in pure science to those who are opening up the new roads in clinical psychiatry; and I took it as a happy indication that those who are to carry on the work of this magnificent institution will continue to draw closer and to make ever more fruitful the relations between pure and applied mental science; a task, I will venture to add, in the service of which the psychiatrists of this country have already distinguished themselves, and have given a much-needed lead to those of my own country.

This being the significance I attribute to my presence here, I venture to bring before you some reflexions on a problem in physiological psychology which has long occupied my thoughts; a problem, which, though it is one of pure science, nevertheless has immediate and fundamental importance for psychiatry and towards the solution of which the workers in that applied science are already doing much and in the future will probably contribute still more largely and directly. It may be defined as the problem of the sources and direction of psycho-physical energy.

I propose to consider the bearing upon this problem of four lines of study; namely (1) pure physiology, (2) comparative psychology and (3) the experimental psychology of the laboratory, (4) the study of mental and nervous disease.

I am not one of those high and dry theorists who hold that physiology and psychology must be kept strictly apart as independent disciplines, and I do not suppose that there is anyone of that persuasion in this assembly. Therefore I make no apology

\* Address delivered at the opening exercises of the Henry Phipps Psychiatric Clinic, The Johns Hopkins Hospital, Baltimore, Md., April 16-18, 1913.

for considering the bearing of these several lines of study upon a problem which confronts all of them. If I consider the bearings of them in the order in which they were mentioned just now, I shall be recapitulating the order of development of my own thought on this problem.

Beginning my studies from the side of experimental physiology I came to regard the nervous system and its functions in the *atomistic* fashion that is still prevalent among the pure physiologists. According to this view it is composed of relatively independent cells or neurones linked together in complex chains and systems; each neurone is an irritable conductor, and its prime function is merely to react to any stimulation applied at any point of it, generally one extremity, by passing on a wave of excitement from that point to all its parts, commonly to its other end, where, if it is in functional connexion with another cell or other cells (nervous or other), the arrival of this wave of physico-chemical excitation acts upon that other cell as a stimulus which provokes in it a similar reaction.

On this view, then, the function of the neurone is essentially to transmit a stimulus from terminal to terminal; to give out at one end the stimulus applied to it at the other. These functional units are regarded as linked together on the plan of reflex arcs of very various degrees of complexity, through which the physico-chemical change propagates itself according to the relative irritability or openness of the various paths thus constituted.

According to this same view, the mental accompaniment of cerebral process consists in the successive and simultaneous appearance in consciousness of sensory elements or sensations of many different qualities, each being, as it were, attached to, and drawn at the heel of, one of the higher or cerebral reflexes.

In briefest outline this was the conception of nervous process which I found prevalent, and which is still prevalent, among the pure physiologists, and accepted also by some of the physiological psychologists. But, when I attempted to apply this scheme of neural action to the cerebral processes involved in the higher modes of mental activity (especially in the course of my experimental studies of attentive perception<sup>1</sup>), I very soon found that it was unworkable; not that it was false, but that it was inadequate; it

<sup>1</sup> "Physiological Factors of the Attention Process." *Mind*, n. s., Vol. XV.

needed to be supplemented by a notion which, I found, had been vaguely entertained and used by those who approached cerebral action, not like the experimental physiologists from below, from the study of artificially isolated elementary functions, but from the study of the working of the psycho-physical organism as an organic whole.

This conception, which I endeavored to make more precise and to recommend to the acceptance of the physiologists, is that which I proposed to call the principle of the *vicarious usage of nervous energy*.<sup>2</sup> According to this conception, the energy (which all agree in regarding as converted from the potential chemical form to some active form within each neurone upon its stimulation) must be regarded as not confined to the neurone within which it has been liberated, but as capable of flowing on, passing into and through other neurones; so that each neurone serves, not only as an irritable conductor of excitation imparted to it, but also as a channel through which the energy liberated within it, and also the energy liberated within others with which it is in functional connexion, may flow from place to place within the nervous system. Such freely flowing energy may conveniently be distinguished from the latent energy stored in the neurones by the designation *Neurokyme* (Forel) or psycho-physical energy.

If we provisionally accept this notion (and there are no established facts of physiology which render it untenable, and many facts of psychology and of organic behavior which demand it), we are at once carried beyond what I have called above the atomistic conception of neural functions. For it follows from this notion, and from the abundant inter-connexion of the many sensory-motor circuits which compose so large a part of the nervous system, that in the waking active state of the organism, when all its sensory receptors are exposed to a perpetual rain of stimuli, the whole of the afferent side of the system, including especially the cerebellum and the basal ganglia of the great brain, must be regarded as constituting a great *common reservoir* of free nervous energy, or neurokyme, upon which all the various efferent channels can draw in turn.

<sup>2</sup> "The Nature of Inhibitory Processes in the Central Nervous System." *Brain*, 1903.

Within the many parts of this common reservoir, the quantity or potential of free energy must be conceived as varying from moment to moment, according to the degree of stimulation to which it is exposed, and according to the freedom of escape permitted to it by the ever-varying conditions of tension within the whole system. But, owing to the abundance of inter-connexion, the freed energy resident in each part can under favorable conditions be led in part at least to any of the many efferent channels, there to be vicariously used for the production or re-enforcement of executive activities. Such vicarious usage, it seemed to me, is involved in all processes of concentrated effort, whether of bodily movement or of attentive perception or thought.

I found strong support for this view in the fact that it enables us to form a working hypothesis for the facts of neural inhibition, at all levels of the nervous system; equally for the reciprocal inhibitions of the spinal reflexes, the phenomena of sensory contrast, and that peculiarity of the higher nervous functions implied by the phrase—the narrowness of the field of attention. I refer to the hypothesis of inhibition by drainage, first foreshadowed in the *magnum opus* of William James, and later developed by myself in several papers.\*

My experimental studies of perceptual attention led me, then, to supplement the *atomistic conception* of the nervous functions with this notion of *vicarious usage* of freed nervous energy, together with the two subsidiary hypotheses implied by it, namely, that of the *common reservoir* of freed energy, and that of *inhibition by drainage*.<sup>†</sup> And the acceptance of this group of mutually implicated notions seemed to go far to explain the fact that the nervous system works as an organic whole rather than as a multiplicity of reflex circuits.

But, when I turned to the study of comparative psychology, I soon realised that my conception of neural functions needed to be supplemented in yet another most important respect. In my

\* *Brain.* *Loc. cit.* and "Primer of Physiological Psychology." London, 1905.

† Support of a novel and important kind for this conception has recently been drawn from the study of the correlations of mental functions by Drs. Spearman and Hart "General Ability, its Existence and Nature," *British Journal of Psychology*, 1912, Vol. V, p. 51.

studies of the physiology of attention, I had well-nigh overlooked a fact of the most fundamental importance. The supplementary hypotheses had provided a neural mechanism for that perpetual shifting of the main stream of psycho-physical energy from one predominantly active neural system to another which is of the very essence of the play of attention in its neural aspect. I had provided a mechanism, but it was a mechanism merely, an inert machine. For its completion the scheme required the recognition of that most peculiar function of organisms which is best expressed by the word *conation*, or, if you like, *will* in the broadest sense of the word, effort towards or striving after ends.

Observation of the behavior of animals shows that the activities of each species are directed almost exclusively towards a small number of special ends—reproduction, the securing of food, the escape from danger, the protection of the young, the violent destruction of whatever opposes these great tendencies, and a few others that differ from species to species. The concentration of the animal upon any one of these ends does not depend upon its acquired experience, but upon some feature of its innate constitution; and that feature is what we commonly and properly call an *instinct*, an innate tendency to strive after some end of a particular kind, an *innate conative tendency*.

Reflexion upon human behavior shows that man also is endowed with innate conative tendencies, which, in the main, are similar to those of the higher animals; and that the great ends of his activities are determined, are set for him also, by these features of his innate constitution.<sup>1</sup>

Now we see that whenever an organism, whether man or animal, is placed in a situation which appeals to one or other of its instincts, which excites or brings into activity one of these great conative tendencies common to the species, that organism acts with vigor and persistency; all its movements and attitudes imply a great liberation and expenditure of nervous energy, which energy is *concentrated* towards securing the instinctive end, and yet in its superabundance tends to overflow its prescribed channels and to suffuse the whole organism. And what we call *emotion* appears to be the bodily and mental expression of this

<sup>1</sup> Cf. my "Introduction to Social Psychology." London, 1908.

great liberation of nervous energy, concentrated primarily in certain nerve channels specific to each instinct, but secondarily overflowing and diffusing itself through the whole or a large part of the system.

Each instinct, then, seems to be in some sense a great spring of psycho-physical energy, a source from which, when it is tapped, when it is excited by the appropriate conjunction of circumstances, psycho-physical energy wells up in a great gush to re-enforce and sustain mental and bodily activity.

At this point I would remind you of a brilliant lecture by William James entitled "The Energies of Men,"\* in which he drew attention to the extraordinarily vigorous and sustained efforts of which men sometimes prove themselves capable under special circumstances. In that lecture James suggested that such exceptional, such extraordinary, displays of energy imply that human nature has the power of drawing somehow upon sources or stores of energy which lie outside the organism, cosmic reservoirs of energy or what not.

Again I would remind you how in Prof. Bergson's scheme of speculative biology life is conceived as a cosmic energy which suffuses and animates each organism.

Now, if one were inclined to accept either of these allied speculations, one would, I think, regard the instincts as the channels through which these supplies of extra- or supra-individual vital energy are drawn into the organism. But as men of science it is, I think, our duty to forbear for the present from such speculations, and to attempt to understand the working of the psycho-physical organism by the aid of less speculative hypotheses.

It is certain that each instinctive mode of behavior implies the presence in the nervous system of an innately organised nervous apparatus of considerable complexity; and recent research makes it seem in the highest degree probable that the nucleus, the essential kernel of each such innate nervous mechanism is contained in the basal ganglia of the brain, more especially in the *optic thalamus*.<sup>†</sup>

\* "Philosophical Review," 1902.

<sup>†</sup> Especially the works of Pagano ("Archives Italiennes de Biologie," 1906), and of Head and Holmes ("Sensory Disturbances from Cerebral Lesions." *Brain*, 1911).

By these facts and reflexions I was led to supplement my earlier scheme of nervous functions in the following way. Still regarding every neurone as the potential seat of a katabolic chemical change of its substance which results in liberation of nervous energy; I came to think of the neural nucleus of each instinct as made up of a group of neurones which are capable in a much higher degree than any others of those metabolic processes whereby potential energy is stored up in the cell and afterwards liberated for discharge through the various channels of the nervous system. This notion seemed to give an intelligible and not impossible explanation of the vigorous and sustained character of the bodily and mental activities with which we respond to any appeal to our instincts.

But on general grounds it seems improbable that some few groups of cells should be endowed with this capacity of storing and liberating energy in so much higher degree than all others. Therefore I have never felt quite content with this conception; and of late a third view of the energy functions of the instincts has begun to prevail in my own mind. Is it not possible that the great outburst of nervous energy which occurs upon the excitement of an instinct to activity, represents, not so much the energy actually liberated by the katabolism of specialised neurones forming the kernel of the instinct, but rather energy liberated over a wider area and in some manner gathered together, concentrated, and directed to specific efferent channels, by the instinctive disposition?

We know that, in the case of many instincts, the conative tendency and the correlated outburst of energy can be excited through many different sensory channels, and we know that in ourselves, in whom free ideas play so great a part, the mere thought or representation of many objects suffices to bring them into activity. May it not be, then, that the essential kernel of each instinct seated in the basal ganglia is a wide channel (or one of high conductive capacity) upon which many channels converge both from below (the afferent channels from the sense organs and from the cerebellum) and from above (from the cortex of the great brain). The conception of the function of the instinctive dispositions in the nervous system to which we are led by this line of reflexion may be rudely illustrated by an analogy. I have

likened the whole of the afferent side of the nervous system, and we might perhaps say the whole cognitive side, to a great common reservoir of energy; the instincts may now be likened to so many deep channels cut through the dam which holds back the contents of the reservoir; each such channel being closed by a delicately poised sluice-gate. When circumstances are such as to throw a little additional pressure upon any one of these sluice-gates (either by way of sense-impressions or representations), the gate swings open and allows the dammed-up energy to flow freely through in a great stream, which primarily finds its way to the efferent channels proper to the particular instinct, but also may overflow in many subsidiary and secondarily acquired channels; and we may suppose that these latter lead especially to those cortical systems which are the neural basis of the representation through which the instinct may be excited. Thus in a rough and vague way, by the conception of a circular reciprocal action between cortical systems and the sub-cortical nucleus of the instinct, we may perhaps explain the persistent self-sustaining character of instinctive activity; the instinct may be excited by way of an idea, or the excitement may primarily reach it (as in the animals) from the sense-organs; but then the instinct plays back upon the idea, holding it before the mind; and the idea in turn plays back upon the instinct-nucleus; and so the main stream of nervous energy is kept in the one great system of channels, and the psycho-physical energy of the whole organism is continuously concentrated upon the achievement of the end proper to the instinct; the play of ideas which subserves this process and enters into this circle of self-sustaining activity being in the developed mind indefinitely complex and prolonged.

The intensive and self-maintaining character of the conative process must be regarded as also conditioned in part by a similar circular or reciprocal excitation taking place between the instinct nucleus and many sensory organs; for the bodily activities in which the instinctive excitement issues bring about the stimulation of many sensory points both in the surface of the body, and in the deeper lying tissues, especially the viscera and the motor organs, thus setting free streams of energy in many afferent paths, all of which will be led back to the afferent side of the instinct-nucleus.

To pass now to the third of the four lines of study which I indicated at the outset as having determined my reflexions on

this topic—namely, the laboratory studies of the Würzburg school or type. I desire more especially to draw your attention to those which throw light on the rôle of volition and conation in general. They have made it clear that in a great number of experimental investigations, especially the numerous elaborate experiments on memory and association, a factor of principal importance has commonly been altogether overlooked, namely, the influence of the *intention* of the subject, of the setting of the will, or, as the Germans say, the influence of the *Aufgabe* (*i. e.*, of the task prescribed and voluntarily accepted by the subject), the determining tendency, the attitude of consciousness, in short of *conation*. They have made it clear that, in the past, experimenters in this field (accepting more or less explicitly the atomistic psychology and the atomistic physiology of the nervous system) have attributed to links of simple association alone, effects in the way of reproduction which are due to two broadly distinguishable factors, namely, associative links on the one hand and the will of the subject on the other; and it appears clearly enough that in many such cases of coöperation of the two factors, the latter, conation, is of altogether preponderant importance.

I may illustrate the point very simply from experiments of my own. It is possible to read repeatedly a list of say twelve non-sense syllables in an attitude of indifference, one as nearly as possible passive; and 150 repetitions of such reading may fail to form such associations as will render possible the free reproduction of the series; yet, if the will be bent upon the task of learning the row, it can be committed to memory by as few as 10 or 12 readings.

Experiments of this class, then, are bringing home to us the magnitude of the influence of conation (volition) as compared with mere temporal contiguity or succession. Mental process is effective in establishing associations (and indeed in all other ways) in proportion as it involves strong conation, strong desire or volition; a fact which implies on the neural side *effective concentration of psycho-physical energy* in proportion to the strength of the conation.\*

\* It may be said with truth that laboratory research of this class does but establish in detail truths which should have been obvious to common observation. And in fact, the truth in question had not altogether escaped the observation of some arm-chair psychologists.

Experiments of this class, then, justify in this way the notion that conation involves some special liberation or concentration of energy within certain psycho-physical systems; but they also compel us to recognise another fact, which also is accessible to common observation; the fact, namely, that a conscious conative effort having once been made (an intention or resolution having once been formed, the will having been consciously set towards a given end), the conative process continues or may continue at work *sub-consciously* for a period of time to which we can set no definite limit. The "*Aufgabe*," the intention, may continue to play a prominent, a predominant, part, even when it has passed altogether from clear consciousness.

In this way these laboratory researches tend to bridge over the gap between the older normal psychology and the newer psychopathology, of which the most important feature is the importance attributed to sub-conscious conative processes. I have in mind especially the doctrines of the school of Freud. I do not wish, indeed I am not competent, to express any opinion as to the value of these doctrines from the medical point of view. But I am convinced that they are performing an important service to psychology, especially in demonstrating the immense influence upon our mental life and conduct of sub-conscious conations, and in fact in forcing upon all who are concerned with human conduct the recognition of conation in general as of fundamental importance for our mental life. I am far from accepting all the conclusions and assumptions of the more extreme exponents of this school, but I hold that, as Prof. E. Bleuler has lately argued,\* its fundamental tenets are continuous with, and are but developments of, psychological truths ascertained and widely accepted on other evidence than that of psychanalysis.

The affectively toned idea, the "complex" whether repressed or not, is an idea or system of ideas which has established functional reciprocity with one or more of the great conative dispositions; *i. e.*, in the language of analogy used above, it has acquired such a special connexion with one of the sluice-gates which close the great channels from the afferent to the efferent side of the nervous system, that the awakening of the idea

\* "Die Psychanalyse Freuds." Leipsic, 1911.

necessarily throws open to some extent the corresponding gate and thus starts the conative cycle. For this reason any such idea takes precedence of others less intimately connected with the great conative tendencies, as a determinant of both bodily and mental activity.

But, besides the powerful sub-conscious operation of conative tendencies, which is perhaps the most fundamental and best grounded doctrine of the Freudian system, there are other conceptions not altogether peculiar to it, but on which psychanalysis has thrown new emphasis. Among these I would indicate especially the notion of *transference of affect*, and that of the *sublimation of a tendency*. The latter especially is a process evidence for which is abundantly afforded by observation of normal life, as well as by psychanalysis. Both these conceptions lend themselves readily to interpretation in terms of the scheme of neural functions I have briefly and crudely outlined. Both obviously demand the notion that the *affect* implies the liberation of large quantities of psycho-physical energy and the possibility of the vicarious usage of this energy to support intellectual and bodily activities which have no primary or original connexion with the instinct whose excitement manifests itself as the *affect*.

I find Freud's conception of the development of the sexual instinct particularly interesting; although the view (apparently implied by some writers of this school) that every other human instinct is a mere offshoot of it seems to me very short-sighted. The conception interests me especially, because it harmonises so well with the notion of the neural basis of the instincts that I have suggested in this paper. Freud, as you know, conceives the development of the sexual instinct in the individual as taking place by the coalescence of a number of sensory-motor tendencies which in the infant ~~are~~ are separate and distinct functions; if we conceive this process in its neural aspect as a growing together, a fusion into one common channel, in the base of the brain of the central ends of the several afferent channels in question, we see that such a process would result in a neural apparatus of the kind I have suggested as the essential neural structure of the instinct. We thus get a neurological picture of the process by which a number of 'erogenous' sensory surfaces and a number of 'erogenous' objects may be swept within the sphere of the sexual impulse, so that they con-

tribute to the intensity of the developed impulse. We have also a rude explanation in neural terms of the fact that when the sexual impulse becomes directed towards its normal object, a person of the other sex, the various aspects and features (both bodily and mental) as well as the material belongings of that person all alike minister to, *i. e.*, serve to awaken and intensify, the desire which is rooted in the sexual instinct; for the various perceptual and ideational systems concerned in the apprehension of these various features become so many additional tributaries to the one great stream of energy which issues from the instinct nucleus.

I would add that, even though it could be clearly shown that the maintenance of the conative cycle depends upon some such anatomical disposition as I have suggested, we could not regard the existence of such anatomical dispositions as affording an explanation in any full sense of that concentration of nervous energy which seems to be of the essence of conative activity. For this concentration seems to involve a raising of energy from a lower to a higher potential and to be the supreme instance of that power of reversing the tendency to degradation of energy which is a fundamental property of all living tissue and perhaps its most characteristic attribute.

But I have kept you too long already. The object of my remarks has been to direct your attention to the *problems of the sources and direction of psycho-physical energy*; to indicate how several very different lines of study lead us up to these problems; and to suggest that all these different lines of study lend some support to a particular neurological hypothesis. There can be no doubt, I think, that these problems are fundamental for the understanding of the development and hygiene of the mind and of the genesis and treatment of much nervous and mental disorder.

## AUTISTIC THINKING.\*

By PROF. E. BLEULER,

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A schizophrenic inmate of an asylum enters a room in a country inn, goes to bed and can only be removed by force, for he expects the Queen of Holland, who wishes to marry him, to arrive at any moment. He is a little, ungainly creature who never in all his life has known any but the most miserable surroundings. He is without a single advantage of mind, body or estate. It is impossible that the Queen of Holland should know anything of this poor patient in Switzerland, and if she did, he certainly would be the last man she could wish to marry. Neither the patient nor his intended bride has taken any of the preliminary steps necessary for a wedding. Neither for the civil ceremony nor for the celebration of the day itself is anything prepared. But all that does not prevent our patient from intending to become Prince Consort upon that day.

The thinking of this patient, which represents a very common type, appears to be sheer nonsense. He imagines something absolutely impossible, and what is more, he believes it to be reality. Its contradictions to reality do not exist for him.

If, however, we don't touch these things, the patient seems to be quite reasonable. He works all the week like a healthy man and goes for a walk on Sundays like ordinary people. Here he thinks rightly and reckons with reality as it is. His thinking, therefore, is not disturbed in all directions. Moreover, there is method in his madness. To marry a princess would naturally be the height of human happiness to any poor unfortunate devil. Our *fairy tales* testify to this. *And it is just a fairy tale with which our friend has to do*, only after a somewhat different fashion than with us rational mortals. He does not *tell* a fairy tale, he does not *read* one, he *lives* his fairy tale. Let us hold this in our minds, and it will at once bring the abnormal man nearer to us healthy ones.

\* Address delivered at the opening exercises of the Henry Phipps Psychiatric Clinic, The Johns Hopkins Hospital, Baltimore, Md., April 16-18, 1913.

Each of us has also his fairy tale. He does not indeed usually believe himself to live it. Only when he is quite alone and his thoughts are let loose does it come to light. The man is then rich, attractive, healthy and handsome. He always chooses those advantages in which he is most hopelessly lacking. Directly reality regains its sway, the plaything will be thrust hastily back into the cupboard, where it is hidden not only from strangers but from the owner himself; for, once outside the dream, he is not at all aware how far he can really identify himself with its characters. But perhaps I have said too much. The cupboard into which the toy is put is in our own brain, and it never shuts tight. Without our noticing it, the imprisoned fairy very often stretches out a hand. She guides our taste in the choice of a tie, she guides our hand when we make the flourish to our signature. By our bearing, our voice, the choice of our phraseology, she shows the expert the trend of our aspirations. We stand therefore far nearer than would have at first sight appeared to the lunatic, whose vagrant thoughts struck us just now so forcibly. At any rate the difference is only a relative one. And when we look more closely we find amongst all normal people many and important instances where thought is divorced both from logic and from reality.

I have called those forms of thinking *autistic*, corresponding to the idea of schizophrenic autismus, which, turning away from reality, sees life in fantastic pictures, and is founded precisely upon autistic thinking. Psychology, until quite lately, had only studied the logical laws of thinking. Just recently Le Bon, Freud and Jung began simultaneously with myself to direct attention to the autistic form.<sup>1</sup>

The knowledge of this kind of thinking is a necessary foundation for the understanding of morbid formations. Moreover, there are important parts of the normal Psyche that it is impossible to understand without a knowledge of the autistic laws.

<sup>1</sup> I have briefly discussed the views of FREUD and JUNG which do not appear to me to satisfy all the facts that come into consideration here, in the *Jahrbuch für psychoanalytische Forschung*, 1912, Vienna, Deuticke. LE BON I had not the opportunity of reading till later; his views are very interesting, but the psychological connections do not seem to me to be sufficiently recognized, and he has not attempted any application to pathology.

These alone throw light upon the important, but hitherto almost ignored, inner life of the individual, upon the influences which shape the creations of the poets, and upon those which impel the peoples in the formation of their views of custom and religion, and in their dealing with home and foreign politics.

The nearer the abnormal come to us normal, and the better we understand them, so much the more successfully can we deal with them, and even if we cannot cure many psychoses as we heal a broken bone, yet we can discharge an increasing number of them so much improved in health, that they are quite capable of living in the society of men and of earning their living. And what must guide us therein is not the diagnoses and the systematical conception of individual diseases, but their psychological mechanisms, as *Adolf Meyer* has shown in his very clever pamphlet. In many sorts of illness it is quite indifferent how we describe and classify, if we can only understand and help the patient.

I am pleased to speak about these things before an American audience, because in this country psychology is free from the prejudices of the old continent, and has in so many regards left behind our sometimes medieval conceptions.

A child plays in the bath with the floating thermometer. He pulls it to and fro pretending that it is a boat. He himself travels on it. Then he makes big waves which sink the boat. Now the thermometer is the little fellow himself who has fallen into the water and sunk, and immediately afterwards it comes up as a big fish that is going to swallow the boy, and is at the same time the stick with which the fish is driven away. At other times the child imagines himself to be a father, a mother, a general, and he acts accordingly, although with the most inadequate material and with the situations not at all corresponding to that which he wishes to represent. Here he ignores reality in a high degree, he only uses just so much of it as is necessary for the part he is playing. The thermometer is there in reality, he uses it in reality, not as a thermometer however, but in a multitude of characters which he imposes upon it. Thus he effaces the difference between reality and fantasy. If a stick, that represents an animal, is broken, the child has real sympathy with the animal, and is in earnest when he tries to console it.

Like the child who wishes himself grown-up and grand, the poet—at least the true poet—transforms his unhappy love into a happy one, or glorifies it in such a way that it appears to him tragically beautiful and sublime. His hero always contains a piece of his own soul, and when he lets him perish he is the personification of one of the tendencies which the poet would wish to overcome in his own life, or one that has stained his conscience with guilt. The death of his hero atones for the poet's own crime. Goethe punishes himself in *Clavigo* and *Weisslingen* for having deserted Frederica Brion. Schiller realized his ambitions in the *Brothers Moor*, in *Fiesco*, in *Wallenstein*, and showed himself to what end they must inevitably lead. In poetry certain real affective needs of the poet are alive, and his characters have an additional reality for him in that he takes as vital an interest in them as in actual human beings. His friends found the poet *Kleist*, who had just drawn the dying scene of *Penthesilea*, dissolved in tears.

Poetry is closely related to *mythology*. And between the two stands *legendary lore*, the formation of which is naturally a very complicated one. We know that there are not real personalities behind all the heroes of the "Sagas." The German Siegfried and the Jewish Samson are really sun gods, but what later generations have made out of them are beings with the human ideals, the virtues and the vices of those who created them.

The greater part of mythology is really symbolism. The times of the year and day, the forces of nature, the fructifying and the scorching power of the sun, the animal procreative power and similar things are represented as human characters and actions. The process is, even more than in the poet, an unconscious one. The myths are understood literally. The sun god drives his chariot across the heavens, and the Greek goddess of wisdom is born from the head of the God of heaven. These conceptions are divorced from reality in a high degree. There are chariots, it is true, but we have no reason to suppose that they drive across heaven. Of course children are born, but never out of the head of a man. All these are examples of a form of thinking that acts independently both of logic and of reality.

If there is not so sharp a contrast with realistic thinking in the play of the child and in poetry, that in mythology is a much more

direct and brutal one, and from the logical point of view these products, with all their wonderful poetry, are sheer nonsense.

In like manner we see in representations of the universe how the earth is supported by an elephant which stands on a huge tortoise, the tortoise on a snake and so on *ad infinitum*. We see the same in these conceptions which answer to our desires to control destiny. With magic and sacrifice and prayer men will try to divert all evil and to attract all good. Neither nature nor experience give us any ground for believing these things, except in so far as we ignore many causal connections between the events, and can therefore assume them, where we see none. But to assume such things as magic and witchcraft we have no logical ground whatsoever.

How great the gap is between autistic and logical or realistic thinking will be clear to us when we realize what logical thinking really is. Firstly it represents occurrences in the outer world and their associations. We have often heard thunder following lightning, therefore whenever we see lightning we expect thunder, and when we hear thunder we take it for granted that it has lightened. We see regular fixed results follow our own actions. We associate the two, and when we desire a particular result we call to mind the actions by which it will be attained. These examples will perhaps suffice to indicate that in logical thinking we reproduce reality.

To fit ourselves to new situations we must be able to create new combinations of the conceptions of experience. So far as these correspond with reality they show us new ways of action, whether it is a question of buying a pair of shoes, or of steering an aeroplane. If they deviate from reality they pass over into autistic thinking.

Our human understanding can never compass everything; we can therefore draw no hard and fast line between the two forms of thinking, but the more knowledge we possess the greater will be the possibility of logical thinking. We moderns believe ourselves to be justified in our assumption that the earth moves round the sun and that the sun himself is a mass of glowing gases. There is no longer any place in our mind for Apollo's chariot.

As a rule the symbolism of the normal individual replaces conceptions which are difficult to represent and to conceive of or

against which there is a resistance. Especially we like to replace abstract by concrete ideas.

The whole railway system will be represented by a wheel with wings, a serpent will represent sin. In dreams and in morbid conditions these symbols will not only be used more frequently, but they will be extended to embrace even easily representable things: a room, for example, may represent a woman.

This can go so far that father and mother are interchanged in the patient's mind. A schizophrenic may conceive a hatred against his father, because he is jealous of him on his mother's account, and then put his mother in his place and want to kill her in his father's place. A father as patient may confound himself in his letters with the mother of his children.

It strikes us, at first sight, as absolute nonsense when a patient maintains that she is Switzerland and the cranes of Ibycus. Upon closer observation we see the sense in her assertion. The patient is confined in an asylum, deprived of her liberty. She yearns for liberty. Switzerland is a Republic, a free country: she also wants to be free. That is the first meaning of her expression "I am Switzerland," but to her it means still more, she takes the thing also literally and *is* Switzerland, Helvetia herself, who is engraved on our coins. Switzerland even belongs to her. She quite means all this in the literal sense. We see here how in autistic thinking the conceptions dissociate themselves and one is put in the place of the other. She *is*, moreover, the cranes of Ibycus, that is, she has—

Frei von Schuld und Fehle  
Bewahrt die kindlich reine Seele.  
[Kept free from guilt and failings  
And pure her childlike soul]—

As Schiller says in his poem entitled the "Cranes of Ibycus." Thus nonsense becomes sense.

A particular form of autistic idea disturbance is the systematic shifting of sexual conceptions to other parts of the body, more especially upwards. A normal two-year old child has been known to ask his pregnant mother: "Why have you such a big head?" It should be stated that this child knew well what the alteration in his mother's figure meant.

Many primitive genital hallucinations are transferred later to other parts of the body, and in the fairy tale as in the crazy ideas of the schizophrenic many a child is born from the mouth. In some instances the poisoning delusion of women originates from their desire for offspring. They believe, as in fairy tales, that they will become pregnant from the food they are given, and some supposed admixture with the food is symbolized as poison.

In the autistic thinking the grossest contradictions may exist side by side, and these contradictions may be within the thought itself as well as contradictions of the representations with the outer world. Just as the child may be little Jack and at the same time the great general, the insane man may be John Brown, but at the same time God Almighty, and often in addition the Pope or the Emperor. The physician who visits the patient is the physician, but he is also the clergyman, Mr. Robinson, and then Major Smith, and the patient is quite aware of all this. Whilst the playing child never loses a certain feeling that he himself puts something into the things, to the deranged these ideas correspond to reality.

But so long as the insane are composed in their thinking, they are partly conscious of the contradictions with what sound people call reality. The possessor of delusional millions gets nothing out of them but the feeling of being rich. As soon as he wants to enjoy his riches, they escape him. To an insane workman the delusions promise a promotion in his position, which, of course, does not happen; so long as the man has a need of causal connections he must seek an explanation for such a contradiction. This explanation lies near: there are people who would keep back his fortune, or slander him to his superiors. The sane and logically thinking man would look for reasons in the outer world, and inquire whether his suspicion is just. The autistic himself creates these reasons. He believes himself justified in concluding from accidental events that certain people speak evil behind his back, but in reality the *fear* of having enemies is for his autistic thinking identical with the fixed *conviction* that they do exist. The autistic thinking does not need to reckon with reality.

Autistic thinking has special connections with sexuality. As Diogenes has already observed, one cannot still the pangs of hunger without real food, but sexual desires may be satisfied by

manipulation on oneself and by mere imagination. Schizophrenic patients may feel all the delights of love through their hallucinations. Nevertheless this unreal satisfaction is not always a full one. Above all, the feelings of sinning against nature mixes something unpleasant with these hallucinations. To explain this, the patients create again delusions of persecution, which, of course, are usually connected with the same person who have been loved. The beloved of the delusion becomes therefore, as a rule, the persecutor. There are still other reasons why autistic thinking does not always reach its goal. It has often its contradictions in itself. Many of our desires, it is true, are connected with agreeable feelings, but often at the same time with disagreeable ones—they are *ambivalent*. The insane peasant may imagine himself a prince and a king; but if he gives the dream too much reality and must also assume the duties of a king and the other unpleasantnesses of the position, he would, I think, gladly resign the honor. Every beloved person has besides his good qualities also disagreeable ones; for instance, his person may be charming, but he has no property. A wife may hate her husband as man, but she will love him as the father of her children.

This ambivalence leads, even with normal people, to difficulties of decision and to inner conflicts. Still more with schizophrenics, with whom we observe scarcely any but ambivalent tendencies at the root of the delusions. Very frequently the mother loves her child because he is her own, but at the same time she hates him because he is also the child of her hated husband. Now and then it happens that in a moment of hatred she kills the child, and afterwards she bitterly repents of her deed. But infinitely more frequent it may be that her wish that the child should die only brings out the delusion that the child has really died. But even then she will be very unhappy; she laments in a normal way the death of the beloved child, although her hatred for him had been the cause of her delusion. More even than that, she will often accuse herself of having killed the child, a fact, which is again a reaction of the unconscious desire that he should die, or that she herself might kill him. In this manner originate frequently quite unfounded self-accusations for a wrong that one has not done at all, but that one has quite unconsciously desired to do. Autistic thinking has represented the wish as fulfilled.

A certain degree of ambivalence is always connected with sexuality, another reason why this is of such great importance in autistic thinking. Psychoanalysis shows that almost all men have at least, in a rudimentary degree, certain abnormal sexual tendencies which, however, scarcely become conscious for them, or at least are overcome without any conscious effort. These abnormal tendencies will be branded as immoral or repulsive either by costume or by the sentiments of the individual himself. The man connects them with disagreeable feelings, although in accordance with their nature they would of course be allied with feelings of pleasure. That is one of the reasons why lust and sin are so closely connected. The positive feeling connected with the abnormal tendency causes in the autistic thinking of morbid states the perverse wishes to appear as though already fulfilled, a fact from which the feeling of repulsion creates delusions of guilt, and various sorts of expiatory acts which express themselves as the different kinds of obsessions.

Especially to be noticed is the Oedipus-complex. The Saga tells us that Oedipus killed his father and married his mother. It was known even in the time of the Greeks that the story was the expression of a universal tendency, and psychoanalysis as well as the study of poetry shows us that even now in the love of children for their parents of the opposite sex there is a certain admixture of sexuality; it is true that this tendency will, perhaps, even at the time of its origin be repressed to the unconscious and come out directly only in dreams and indirectly in its results. In the autistic thinking of neuroses and psychoses we very often find self-accusations and hallucinations which give expression to the love for the parent.

We have seen thus far that autistic thinking is not bound by the laws of logic and reality. It is unlogical, and permits the greatest contradictions with the outer world and in itself. The autistic patient may empty the slops in the asylum and at the same time believe himself to be the emperor of the world; or he can be nursed in his own family with all the kindness of which a mother or a wife is capable, and nevertheless believe himself to be constantly ill-treated. The insane as well as the sane can have the most diverse wishes side by side: to be a child again, in order to be able to enjoy unconditionally; to be a man in his prime, in

order to obtain all that life has to offer of power and greatness, to live long and to exchange this existence for Nirvana; to possess the woman he loves and yet retain his full liberty.

From the different examples mentioned above we may recognize how autistic thinking, cut loose from logic, will be directed; it has a tendency to represent desires as already fulfilled. Freud asserts that his pleasure-mechanisms, which correspond in some degree to our autistic thinking, *can* do nothing but desire. But then he is forced into somewhat daring explanations. In analysed dreams he often finds fears represented of which some can easily be explained as hidden desires, as that of a friend who would like to prove to him that his theories are false, and therefore must have a dream which apparently contains no desire. In other cases he might back his argument by saying that in fact every fear contains a desire, namely the desire that the dreaded event shall not happen. In this manner, of course, everything can be explained. If we observe delusions in general we find that desires certainly play a great part in them, but that the delusion content is always dependent on affectivity. The melancholic has depressive delusions and feels himself sinful, poor, incurably ill. The euphoric has grandiose ideas, he is a particularly clever man, rich, more efficient than ever, and if his intelligence is somewhat disturbed he may possess the whole world and think himself equal with God. The irritated becomes suspicious, and is inclined to feel himself injured and persecuted.

For him who knows the psychology of affectivity it is easy to understand the formation of these delusions. Every affect has the tendency to favor those ideas which correspond to it, and to hinder or to suppress those which are in contradiction to it. The jolly do not like to think sad thoughts, the sad are even less inclined to let happy thoughts arise in them. Now when only one tendency is taken into consideration logic must needs come to a false conclusion, like the bookkeeper who only takes into account the assets or only the liabilities.

Now these conditions, which usually come into consideration in autistic thinking, do not deal with universal disturbance of affectivity (as with the maniac or melancholic), but on the contrary with single affectful idea complexes which can generally be described as desires or fears. The feelings connected with them

must naturally have their effects, that is they create a tendency to ignore the inhibitions which hinder the fulfillment of the desire or the realization of what is feared; thus the patient is driven to the conviction that the wish has been fulfilled, if other tendencies do not correct it. With the normal it seldom comes to deceptions which stand in direct contradiction to reality, but where the possibility of fulfillment is present, it is very easily imagined: "What one wishes, one believes."

What keeps the autistic thinking in healthy persons within certain limits is in fact logical thinking. Where the balance between affectivity and logical thinking is upset, autistic thinking may get the upperhand:

1. As with children, who have not enough experience to discriminate logical possibilities;
2. In subjects which are not sufficiently accessible to our knowledge and our logic; in the questions of the first principles, in the *weltanschauung*, in religion, in love;
3. Where for any reason the emotions obtain too great a significance, as in strong affects, be they pathological or normal, whether they are caused by accidental circumstances or by the subject's own temperament;
4. Where the connection of associations is loosened, in dream, in schizophrenia and so on.

Whilst universal pleasant or unpleasant emotions have equal significance in the usual formation of delusions, in those emotions which are connected with particular ideas the effects of the two qualities are very different. There is indeed a universal tendency to seize pleasure and to repulse pain. The mere thinking of pleasant things gives pleasure, of unpleasant things pain; thus the man in an average mood will much more easily call up pleasant than unpleasant ideas. That is the reason why autistic thinking represents more fulfilled desires than realized fears.

The suppression of unpleasant thoughts has still other indirect consequences. It does not always succeed. The repressed thoughts may live on in the unconscious and from thence provoke abnormal symptoms which will be created in an autistic way. In its stead a symptom will come to the surface: the sexual sinner forgets his misdeeds and strives for exaggerated physical purity. From that may come a washing obsession; or somebody wishes

that his rival who is called Stout may die ; he goes in for a stupidly exaggerated weight reduction cure and kills Mr. Stout in his own body.

We have here touched connections between autistic thinking and the unconscious. Freud is inclined to identify the two ; what I have here called autistic thinking is for him the form of thinking of the unconscious. You see, however, that in mythological conceptions, in the play of the child, with many poets, in dreams and in many other instances autistic thinking is just as conscious as logical thinking. Every psychologist who does not, from theoretical reasons, altogether deny the unconscious, knows that this also can think logically ; Carpenter, for instance, has cited a great number of cases in which the unconscious activity was a logical one, as when a mathematician suddenly finds the solution to a difficult problem.

Autistic thinking can therefore be conscious and unconscious, but in the cases which have pathological significance it is almost always unconscious. To the neurotic only his symptoms, his pains, his obsessions will usually become conscious, the underlying autistic mechanisms of which will be hidden from him. The voices of the schizophrenic express ideas which are produced in autistic unconsciousness, and delusions often may suddenly rush up out of the unconscious.

The unconscious can think logically or autistically. I don't want to say that it thinks more often autistically than logically ; but for pathology the autistic unconscious has also its particular significance in regard to the logical unconscious.

In comparison with the guidance of autistic thinking by the emotions the other kinds of associations of ideas have little significance. Many of its associations follow, of course, the ordinary logical laws. But only such associations will be used as correspond to the feeling-toned idea that is to the desire or the fear. Besides, these secondary associations which we know from the free associations of the normal and which in logical thinking are kept down as much as possible, may become more prominent. But this occurs only as far as they can be used for the aims of autistic thinking. Thus we find that the thoughts spring from one object to a similar one, and especially that they generalize themselves. A girl is frightened by a bull. The first impression was

made by its genitals. Afterwards she identifies these with the horns. Some years later she had forgotten the whole event; but becomes afraid of everything that looks like horns or is called horn; e. g., she will eat no soup which contains horn-shaped noodles. Often the association is directed by the word-sound, as in the case of the above-mentioned rival Stout, who makes his anti-fat cure. But most frequently slight similarities will be used to represent one thing by the other in a symbolical way. The sun moves across the heavens, so by some he is pictured with feet, to others he is a god who drives in a chariot.

Such symbolic images occur just as well among the modern schizophrenic as in the makers of myths of old times and among savages. Certain scientists have therefore spoken of an archaic form of thinking. I myself cannot accept this opinion. Savages can think as logically as ourselves in all the things they understand. The difference lies in the fact that they understand fewer things and therefore with them the autistic thinking more frequently comes in than with us; and we on the contrary think as autistic as the ancients, whenever reality allows it. This year, 1913, is dreaded by many people; in certain countries a great number of marriages have been hastened on at the end of last year in order not to allow so important an event to be connected with the unlucky number of thirteen. Our political parties think autistic just as much and as little as the Romans and Greeks did.

Often, especially in politics, autistic thinking serves instincts. That is quite intelligible, when we know how closely connected instincts and emotions are. But it often leads our instincts astray. The taboo makes the life of the savage a chain of ceremonies which would be unbearable to us, and which would stand in the way of any development in culture, even if the race were capable of it. The alleged witchcraft gives the medicine man the means of living in plenty not only without productive work but greatly to the harm of his fellows. Religious wars from the time of Buddha to our own century, the burning of heretics and witches are no beneficial events for humanity; and even now religious division is the greatest danger for our mightiest military power, the German Empire. In all civilized countries the party system affords opportunities of rendering the best energies unfruitful and of lowering public morality; for the outsider detects in them

only a very small kernel of ideal or material aims worth fighting for, whereas it is always catch-words and religion-like dogmas that are the deciding factors.

How then could autistic thinking develop and last, if it is so harmful among both normal and abnormal people?

It is the most important distinction between the human understanding and that of the higher animals that it can create new combinations. But, as I have said, the boundary line between rational and autistic speculations cannot be laid down by human intellect. What is inconceivable to-day may to-morrow become fact; what is firmly believed to-day may to-morrow become false. Therefore a humanity without autistic thinking could not have been developed. But autistic thinking being once there, it will be used, whensoever convenient, whether useful or not. Now conceptions are pleasant or unpleasant just as well as outer experiences. One can therefore give pleasure to oneself by dwelling on pleasant ideas. But the animal organism is from phylogenetically ancient times adapted to seek pleasure and to avoid pain. In the outer world the pleasure and pain-provoking events are such that this reaction upon them corresponds in general to our needs. But in pure imagination at once a new field of unlimited possibilities unfolds itself. Therein is the danger for man and at the same time his advantage over the brutes.

The health of the individual and of nations demands a balanced proportion of autistic and realistic function. The realistic must control the autistic. But the autistic contains most of our ideals. Let us take care to keep them on the same level as our technical progress and not to misuse them to harass and to destroy our neighbors.

But autistic thinking has also a direct value. The child accustomes himself by his phantasies to the situations of his future life; in autistic activity he exercises his power of thinking, as the kitten does his hunting capacity in play. The autistic forms of thinking in religion have for thousands of years given form to human ethics; they have created ideals which would be impossible to logical thinking, dim ideals certainly, but guiding stars towards which mankind may direct his groping way.

## PERSONALITY AND PSYCHOSIS.\*

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The fact that there exists a relationship between the mental characteristics of an individual, as they exist before a definite psychosis breaks out, and the type of the psychosis itself, is at times so obvious that it has always attracted more or less attention. In this brief discussion of the subject of personality and psychosis, which I have been asked to present here, I wish to limit myself to a consideration of this problem in so far as the two largest groups of psychoses are concerned, namely, those which we designate as manic-depressive insanity and as dementia *præcox*. It would lead me too far to give anything like a survey of the opinions held in regard to the problem which interests us here. It may suffice, therefore, to state briefly Kraepelin's standpoint, which is quite representative of the *general* drift of opinion. He admits, with many others, that in the mild forms of manic-depressive insanity the psychosis appears to be a continuation or further development of a somewhat peculiar personality, and we may add here that the same is usually recognized for some other psychoses, as, for example, certain paranoias. On the other hand, he points out that in the more marked states of manic-depressive insanity, the personality is so much submerged that we can no longer speak of any relationship between personality and psychosis. So far as dementia *præcox* is concerned, the special personal traits, if any exist, can, in his opinion, not be of any great importance, since the psychosis, like general paralysis, shows so much that is alike in the different cases that the personal peculiarities completely recede to the background before those phenomena or defect symptoms which are caused by the disease process. Therefore, what is admitted generally for the neuroses and for the so-called psychoses of degenerates, namely, that the active symptoms represent a further development of earlier milder traits, is admitted only for some form of manic-depressive insanity, while in regard to other forms,

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and especially in regard to dementia *præcox*, the question which is asked seems to be rather, whether the psychosis is or is not colored by the personality.

What appears to us, from our studies, the most natural point of view from which to consider the whole problem, is to regard the peculiarities of the personality, and the psychosis both, as deviations along the same lines and as phenomena of the same nature.

We shall first briefly present the facts which a study of the anamneses and of the patients teaches, and I may be pardoned for giving here essentially our own results. I may state that the systematic collection of facts refers especially to better situated patients, which, for a study of this kind, furnish material that is more reliable than that gathered among a more uneducated class. But it should also be added that general observations in our more recent material confirm our conclusions, and it has scarcely seemed worth while to accumulate statistics, as the essential, after all, is the determination of definite tendencies.

In *dementia præcox*, which is regarded by many as a disease process, while the constitutional element is more or less plainly disregarded, the incentive to look for personal peculiarities has for this very reason not been very great. Nevertheless, the facts are often so plain that most writers speak of a certain, though relatively small, proportion of cases of dementia *præcox* which have shown certain peculiar traits more or less throughout their lives. After Adolf Meyer had formulated his conception of dementia *præcox* as a habit deterioration, and had, therefore, insisted upon the importance of the personality in the genesis of the disease, I was able to point, several years ago, to the frequency with which certain characteristics were found in the individuals who later developed dementia *præcox*. It was found in two different studies that in as many as from 50 to 60 per cent of the cases the chief traits which had existed before the mental breakdown were those which I at that time called the shut-in tendencies—tendencies to which Professor Bleuler has recently applied the term autism—and I was also impressed with the fact that, especially in the second, more carefully searched, group, only a relatively small proportion of cases were found to have been quite natural, frank, open and well-balanced. Professor Bleuler, in his admirable work on dementia *præcox*, also comes to the conclusion that if we

have adequate anamneses it is rare not to find personal peculiarities before the onset of the psychosis, and he also speaks of the large percentage of the type of personalities which we have mentioned. Still more recently, Ritterhaus has confirmed these observations, so that at present there can no longer be any question as to the facts. It is as yet, perhaps, difficult to interpret the symptomatology of all these peculiarities, but that the shut-in tendencies, which are the most common, are also the most characteristic, can hardly be denied. From this point of view we must probably interpret some other pronounced traits of peculiarly warped personalities, but it would lead too far to discuss here the different types. It must, of course, be admitted that there are cases in which we are unable to obtain a history of such abnormal traits before the psychosis, but it is interesting to note in this connection that, as we shall see, such cases are less frequent in the group of dementia *præcox* than in that of manic-depressive insanity. We shall return to this later.

In patients who develop *manic-depressive insanity*, it has been found that in a considerable number either hypomanic or depressive tendencies were found to be a personal characteristic throughout the lives of the individuals. They are described either as overactive, stirring, inclined to overdo, vivacious, or as intense and easily excited, high strung and very enthusiastic, or sometimes as of violent temper, etc. On the other hand, other patients are described as inclined to blue spells, to fight battles over again, prone to worry over trifles, borrow trouble, etc. In some instances, a certain instability of mood was also noted—in other words, the two extremes of emotional reaction are found in these persons. These conditions were observed in 44 per cent of 218 cases, or, more specifically, the elated type in 18 per cent, and the depressive type in 26 per cent. If we now group the cases into those who show in their psychoses preeminently manic elements, either recurrent manias or both manias and depressions, but with an emphasis on the former, and into a group of cases which show in their psychoses depressive elements, that is, either merely depressions or both depressions and manias, but with an emphasis on the depressions we have two classes which we can compare as to the frequency with which one or the other personality occurs. In this comparison it was found that certain very definite tendencies prevailed, inasmuch as in the patients who had more preeminently

manic attacks, the hypomanic traits of the personality predominated very greatly over the depressive traits; while in the cases which showed essentially depressive psychoses, the depressive tendencies of the personalities predominated very greatly over the hypomanic tendencies. It is of interest to note that the tendency of personal traits to coincide with the character of the psychoses was not seen, for those personal peculiarities which are more plainly within the normal lines (I mean for the not inconsiderable number of persons who are described, on the one hand, merely as cheerful, or, on the other, as quiet) these characteristics occur with about equal frequency in the different groups of manic-depressive insanity. From this study, two facts are evident: First, that *exaggerated* emotional traits occur in a considerable proportion of persons who develop manic-depressive psychoses. Secondly, that the personal traits and the type of the psychosis, though not always the same, show a marked tendency to run along similar lines.

In discussing all these findings we shall take the two groups separately.

In the case of dementia *præcox* we have seen that among the individuals who develop psychoses belonging to this group the number of abnormal personalities is much larger than is generally supposed. This is the important fact with which we must start. By many psychiatrists dementia *præcox* is regarded as a circumscribed disease process which is supposed to be due to some toxic agent. In this conception the question of constitution is either disregarded or it is at any rate not given much consideration in the formulation of the nature of the disease; but it appears to us that the constitutional factors should here form the very starting point of all further discussion, because those factors which, in the group of degenerates, for example, are justly said to indicate the constitutional nature of the disorder, namely, the tendency to abnormal reactions through life, together with the great importance which heredity plays in them; these factors are equally prominent in dementia *præcox*, as in the other constitutional psychopathies. I fail to see the reasons for interpreting the personal peculiarities seen in so many dementia *præcox* cases from an entirely different aspect than we regard them in many of the other disorders, and to look upon them as due to a disease process not determined by constitutional factors.

There are, therefore, certain similarities between such conditions as the neuroses and dementia *præcox*, and we must ask whether the dissimilarities are so great that we have to disregard this parallelism and take refuge in a totally different kind of interpretation of the disorder.

Of recent years much attention has been paid to the psychological mechanisms of dementia *præcox*. It has been possible, by careful studies, to understand many apparently bizarre manifestations of the disorder. If one has observed many cases of dementia *præcox* from this point of view, one cannot help getting impressed with the fact that just as is the case in the neuroses, so here the symptoms are not merely scattered productions, but have a definite meaning to the patient; indeed, this meaning is sometimes more transparent in dementia *præcox* than in the neuroses. It has also been possible to show that mental causes are frequently found to bring about the attacks. I need hardly say that by Freud and Jung much stress has been laid on the essential similarity between the neuroses and dementia *præcox*, and, above all, it is Professor Bleuler who, in his recent work on schizophrenia, has called attention to the possibility of a psychological interpretation of many symptoms, as well as to the precipitating mental causes, at least so far as the acute syndromes are concerned; and, indeed, our experience shows that while physical causes play their part in precipitating attacks, as they do in the case of the neuroses, the *mental* causes are the more prevalent and the more important. But we must not expect such causes to be simple and at once comprehensible without further analysis. They need not be single occurrences or demands for adaptation, but situations sometimes of longer duration, and we must expect to understand them only in their setting, as it were, in the meaning which the patient consciously or unconsciously gives to them; in other words, we must know their background, their relationship to various trends in the patient's mind. Or we can also express it that we must know the internal development of peculiar attitudes in the patient's mind which determine the reaction. Whatever we may think of certain formulations of it, we must admit that psychoanalysis is the first systematic attempt to deal with the internal history, or the development of mental attitudes and reactions; and that such an internal development must exist can hardly be denied, nor can we deny that

studies which elucidate such internal developments should stand in the foreground of psychiatric interest. Professor Bleuler, who has pointed to the frequency with which acute syndromes in dementia praecox are produced psychogenetically, assumes, however, an underlying disease process of a different nature and caused in a different manner. To us it is difficult to see why the personal peculiarities and the acute syndromes should not both represent reactions which are partly determined by demands of adaptation, partly by constitutional inability to accomplish such adaptations. Some years ago I took occasion to emphasize the essential similarity between the personal peculiarities and the psychosis, and especially the deterioration in dementia praecox, and what we now know about autistic thinking makes such a parallelism even more apparent.

If I understand the situation correctly, there are chiefly two points which determine Professor Bleuler's view that the acute syndromes and the disease, as such, are not of the same genesis. The first point is the fact that the autistic thinking in dementia praecox is more dissociated than that of normal day dreaming or that of hysteria. To this we can only say that we have in the personalities who develop dementia praecox a tendency to reactions which, primarily and fundamentally, interfere with the contact with, and the reference to, reality. Whatever we may find to describe in these personalities, this is evidently the central feature. It seems, however, that this marked turning away from reality is in itself enough to explain the greater deviation from logical thinking, which means after all, thinking adapted to reality and determined by the relationships in the world of phenomena. We appreciate this all the more when we know that failures of adaptation are regularly associated, in this disorder, with a still greater exclusion of reality. The second point is one which is frequently mentioned. I mean the fact that it is difficult to regard from the same aspect the functional, recoverable neuroses and a disorder which, like dementia praecox, leads to deterioration. This, it must be admitted, argues against the functional nature of the disease. But the rather uncertain conception of functional disorder, after all, means only that the lack of adjustment does not go beyond a certain elasticity, to the extent that the swinging back to normal activity would be precluded. I mean: We lay here stress upon

the recoverability, a factor, therefore, which surely is of great practical importance, but we do not know whether it is of fundamental significance, so far as the nature of the disease is concerned. I do not know how we could otherwise formulate the situation which we find in the neuroses and in the constitutional disorders generally, than in the sense of a defect of development and a defect of adaptation. If we assume in dementia *præcox* a similar constitutional defect of adaptation, as what we find in the neuroses and the other psychoses which belong to this group we are as yet not able to say for any of these disorders upon what this defect depends, but since we are dealing with mental adaptations it is natural that we should be able to express the interrelation in terms of demands for mental adaptation and mental reactions, in other words essentially in terms of mental functions. We must expect, therefore, to be able to describe what takes place in this way, and that this is becoming more and more possible no one who has worked with actual cases from this point of view will deny. But this is only one aspect. We cannot doubt that processes of a more organic nature accompany the mental ones, and we naturally think of brain processes and processes associated with internal secretions, but since we know so little of such factors we are primarily impressed with the mental side. We must also expect that any defective endowment must have its organic foundation, but here, too, it is at present difficult to speculate. In the case of dementia *præcox* there are, however, certain facts which are of great importance in this connection. In the first place, the anatomical studies of the brain of dementia *præcox* cases sometimes reveal *actual defects of development*. We find atypical nerve cells, nerve cells with two nuclei, indeed even evidences of microgyria. Such facts cannot be disregarded. The second point is that dementia *præcox* seems more often associated with congenital intellectual defects than, for example, manic-depressive insanity or the neuroses. This intellectual defect is by no means an integral part of dementia *præcox*, and does not belong to the usual characteristics of the constitutional traits, but it seems more frequently *associated* with dementia *præcox* than with the other disorders. While we see of course not clearly enough to construct anything like a quantitative scale of defects of endowment, these facts show that dementia *præcox* develops on a more serious defect

of constitution than, for example, the neuroses or manic-depressive insanity, and that it stands closer to the hereditary intellectual deficiencies than the other disorders, though we are at present not able to see any direct relation between intellectual and other constitutional defects. Therefore, while the term functional psychosis is one which we had better replace by a wider concept, namely, that of constitutional psychosis, and while we lay then the emphasis on something for which we have a great deal of evidence, we assume in dementia *præcox* a more marked arrest of development, which mentally shows itself in a much more pronounced defect of adaptation, one which is more frequently in evidence throughout the lives of the individuals than in manic-depressive insanity, for example, and one which may even show itself in certain *organic* evidences of faulty development. It is under these circumstances less incomprehensible that in such cases a readjustment is often no longer possible. In this connection it is interesting to note, however, that when once a certain level of deterioration is reached in dementia *præcox*, the progression is by no means the rule as is sometimes supposed, and as we are accustomed to find it in the typical organic disorders in which there is a continuation of the cause. That anatomical changes may exist in dementia *præcox* seems established, but we must admit that they are still very difficult to interpret. What conception we shall form of them, we must leave to the future to decide.

If these arguments are granted to be correct, then we have no reason to disregard the similarities between dementia *præcox* and the other constitutional psychopathies, or to assume a fundamentally different disease process. Then we must also look upon all these disorders as belonging in one large group. This Moebius has done. He has consistently classed all these conditions, dementia *præcox* included, in his large group of *Entartung*. A striking fact within this large group is the existence of transition forms between the various subgroups. This is well known and clearly stated by most writers, so far as the neurosis, manic-depressive insanity, paranoia, the so-called psychoses of degenerates in the narrower sense, or the so-called degenerate personalities are concerned, and upon this fact depends the difficulty of classification. But dementia *præcox* is excluded, and transitions from dementia *præcox* to the neuroses, to manic-depressive

insanity, etc., are denied, although the possibility of such transitions is, in the recent literature at least, seriously discussed. I cannot help feeling that if we look at our cases without prejudice, such transitions from dementia *præcox* to other constitutional disorders are difficult to deny. Of course we cannot prove this clinically. I can imagine no case in which the claim that such a transition is only apparent can be disproved on clinical grounds. The possibility can be admitted only when we concede the argument that dementia *præcox* belongs as much to the general group of constitutional Entartung as, for example, manic-depressive insanity and the neuroses.

In the discussion of manic-depressive insanity we shall have to be quite brief. We have seen that what characterizes a considerable proportion of individuals who develop this disease are evidences of exaggerated emotions and a tendency for these emotions to be of the same nature as the psychosis. The results which we have, therefore obtained do not differ markedly from those of many others; perhaps the parallelism between the personality and the psychosis is more evident than is generally believed. This is undoubtedly due to the fact that we have grouped our cases into the *essentially* manic and the *essentially* depressive psychoses. The idea that manic-depressive insanity often represents an increase of a reaction type has repeatedly been expressed and it is further corroborated here. In this disorder also, the constitutional nature is generally admitted. Compared with this evidence, the question whether, in the more marked attacks, the personality is submerged or not, is one which in our formulation of the problem is of minor importance. But I think we are here also accumulating facts which will show that the similarity between manic-depressive insanity and the neuroses may be greater than is usually assumed. The idea is frequently expressed that manic-depressive attacks may represent a sort of organic reaction. The fact that in general paralysis and in Basedow's disease similar conditions are observed suggests this. On the other hand the symptomatology of manic-depressive insanity is essentially that of the normal emotional states, and these latter are reactions to definite situations which, like all other similar reactions, are determined by internal and external *mental* factors. Such a causal relation is, however, often denied in the case of the pathological states. We may here mention an interesting parallelism

in the problem of anxiety. The anxiety found in neuroses has also been looked upon as an essentially organic reaction, and various determinants have been suggested. It seems to me that the recent studies of Jones and Saif, based upon earlier investigations and formulations of Freud, have shown clearly that the genesis of such attacks of anxiety is in many cases explained by external and internal situations, and that the reaction of anxiety, therefore, preserves, in its pathological states, its essential character as *mental* reaction.

While it has often been impossible to find precipitating mental causes in manic-depressive insanity, a careful search for them, nevertheless, shows that they can be found more frequently than we are led to think on superficial study. This is especially true when we attempt to understand them in their setting, and it is to be expected that further studies will bring us more and more data to show the *mental* forces at work in this disease.

What we desired to show in this brief discussion, in which only the main points could be touched, is, then, the frequency and the importance of abnormal manifestations in patients who later develop manic-depressive insanity and dementia praecox, and to point out the fact that the symptomatology of these manifestations has much in common with that of the psychosis. The same is found in the neuroses. These peculiar traits of the personality are more frequent in cases which develop the graver disorders, which we call dementia praecox, than in those which break down with the more benign manic-depressive attacks. In interpreting the facts it appeared to us that there is enough reason to regard the relationship of personality and psychosis, even in the case of dementia praecox, from the point of view of faulty development or of defects of adaptation, in other words, as dependent upon a defective *Anlage*, which often shows itself in definite symptoms throughout life. Therefore, both the pathological personality, with its milder manifestations; and the psychosis, with its more complete break of compensation, may be looked upon as determined by constitutional factors, in the sense that when demands for adaptation arise the individual is found unfit to meet them, unfit through inherent weakness, but also at times, to quite an extent, through false attitudes which have developed through lack of proper training. In this last direction lies our hope for modifying these defects.

## THE PERSONAL FACTOR IN ASSOCIATION REACTIONS.\*

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On the outpost line of dynamic psychology are the group of association experiments. There are no others which rank with them in their closeness of contact with the essential features of the personality. For this reason, perhaps, they have also been a good touchstone of the psychological attitude of their investigators. It is a far cry from Bühler to Jung; from the pale blue of Wirth's *Archiv* to the crimson of Brodmann's *Journal*. Here we bespeak a clear field for our experimental methods as, in aiding the comprehension of our cases, they meet the test of concrete experience.

From all angles of normal psychology, the greater share of attention has gone to the tests of controlled association. Regarded essentially as intelligence tests, they have been constructed with a rather exclusive view to this function. In general, the psychological test of intelligence are incomparably more developed than those of any other sphere; many of them are difficult to pick flaws in, as tests of intelligence. Why then should they fail when put to the test of concrete experience? For one reason that they restrict themselves to a function whose importance for adaptation to life is overestimated in the conventional teachings of psychology. As intelligence tests, they measure speed, complexity and retentivity in the processes of acquiring ideas. Useful attributes all, but not of the kind that necessarily contribute to mental balance. These qualities are of advantage to the personality only as they are made effective in terms of action.

Such proper organic adaptation to the environment regularly demands some sort of outward reaction upon it. If the personality is to maintain itself in the external world, the behavior, with its mental concomitants, must be properly adjusted to the reality

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of that external world. This is the foundation of all healthy reaction types, mental or otherwise. There exists, however, another guiding principle in mental behavior, directing it not with reference to the external world, but back again upon the personality itself. In their broadest sense, these phenomena include those summed up by Professor Bleuler in the invaluable conception of autism. At its deepest level, this represents a thorough exclusion of and withdrawal from the environment that seems to exist in dementia *præcox*. At a less profound level it appears in ruminations and daydreams where imagination is called on for what is lacking in reality. At the most superficial level it is seen in an exaggeration of the egocentric element in mental reaction, a tendency to elaborate situations in especially personal reference, dominated by subjective factors of pleasantness and unpleasantness that overshadow those of objective, logical, rational value. Plainly here is a tendency that holds out many prospects of difficulty in adaptation to life. It is closely bound up with another, the adequacy and proper coordination, call it discipline, if you will, of the emotional reactions. Not only in dementia *præcox* have we to reckon with ataxia of noopsyche and thymopsyche, but as a widespread factor predisposing to difficulties of adjustment in all personalities it affects. Feeling is the arch-disturber of psychic balance—Pathé is the twin sister of Eris.

Thus then are the great potential obstacles to mental adaptation. Our concrete issue is to consider how they are likely to influence the mental trend as it can be studied through association experiments.

Experimental inquiry into these questions is now dominated by the free association experiment. As a scientific instrument it is necessary to consider it quantitatively all along the line, and the favorable situation in this respect is essentially due to the light thrown upon it from psychopathological sources.

The simplest aspect of the relation of stimulus and response in these experiments is the reaction time;<sup>1</sup> and its first noteworthy property is that it is longer than the reaction time of many controlled associations. One can often name the opposites of simple adjectives more promptly than one can name the first idea they

<sup>1</sup> Some Properties of the Free Association Time, *Psychol. Rev.* 18, 1911, pp. 1-23.

arouse. This indicates a change in the conditions introduced by the latter procedure, which imposes difficulties, hesitations, obstructions, resistances, that are absent in the former. The analysis of these difficulties is the problem of the free association time.

It is not an index of the speed of the *thought-processes*, but of a certain external reaction, not so much an intellectual measure as the controlled association tests, and more of a volitional one. Not necessarily the speed with which a response is found, but the freedom with which it is uttered.

Broadly speaking, the median reaction time of such experiments is about two seconds, the times are seldom shorter than one, and range to infinity, when there is a failure of response; but in spite of this great unreliability of single observations, it is found that different people do have measurable differences in this association time, of the promptness with which the responses appear.<sup>2</sup> The median measures of different persons range from a second and a half to four seconds. The most important point of individual difference is the extent to which the measures above the median depart from it, for this is the most direct index of the amount of obstruction to response that the subject shows.

This would be roughly given in the difference between the median and the average; and it was thus that Jung came to suggest this ratio as a coefficient of the subject's emotivity. It is in its relation to the emotional reactions that the association time touches upon our fundamental questions. Accordingly the greatest tendency to emotional reaction would be shown in those subjects in whom the difference was greatest. But this is true only if the emotional reaction is a very dominant factor in lengthening the time, and that is not the case. Nor is it true that the time is lengthened in any close proportion to the emotional reaction. That part of the difficulty in response which is the product of special emotional reaction must be determined by procedures which control the other factors, as ideational type.

Under the conditions of the writer's observations a very commensurable group of fifteen women and ten men showed a division of the women into two groups, half responding some-

<sup>2</sup> The Question of Association Types. *Psychol. Rev.* 19, 1912, *esp.* pp. 255-257.

what more promptly than the men, half distinctly slower.<sup>3</sup> The person having the best available knowledge of those subjects, one also of good experience and exceptional balance, was questioned concerning differences in personality between these two groups; a distinct cleavage appeared, with one or two equally distinct exceptions, differentiating the two groups on the basis of a quality whose best one word rendering is *depth*. The group exceeding in this quality is the group of the longer reaction times. This might, and probably does, bear out the emotional interpretation; but has to reckon with the further fact that those of this group were much better in the performance of official duty, and have during the years since these experiments made much the better success of life. One must be prepared to meet such sharp reminders that mental balance is not a function of independent qualities, but one of their interplay.

On the whole, less practical attention can justly be paid to the association time now than formerly. Its relations to the emotional sphere are too equivocal, and for individual observations it has not proved the best of *Komplexmerkmale*, either in the Zurich work, or in the writer's.<sup>4</sup> Extra-conscious emotions are sometimes called on to explain lengthened times, but to do this with justice it is necessary to show that the correlation of the different *Komplexmerkmale* with each other is closer than their correlation with the introspection. I know only one series of observations on this point, which was negative.<sup>5</sup>

A better insight into the relation of the personality to these experimental reaction types is obtained through studying the responses on the basis of their content. The experiment is to be observed in its relation to egocentricity and to emotional reaction; first is to be measured the degree to which the responses represent a personal reaction to the stimuli. At the time when the original progress in this direction was made, the problem was not so clear as it is now, and there was a tendency towards the grammatical view-point in dealing with the responses that was often confusing psychologically. The scheme did, however, bring out the

<sup>3</sup> Some Properties of the Free Association Time. *Psychol. Rev.* 18, 1911, *esp.* p. 5.

<sup>4</sup> Wells and Forbes, On Certain Electrical Processes, etc. *Arch. of Psychol.* 16, *esp.* pp. 34-35.

<sup>5</sup> *Ibid.*, *esp.* p. 35.

central fact of a group of associations having more subjectively experiential character, namely the predicate group, with its intimate congener, the *Konstellationstypus*; and it was found that opposed to records of this class were others in which the type was more objective or concrete. There is an entire continuum between individuals of these different reaction types; it is doubtful if they even form separate species. Since the essential difference was, however, in Jung's own words, that of "subjectiver Weise der Auffassung," it was desirable not to restrict its conception to the predicate category, but rather to include all types of association in which special egocentricity of reaction was indicated. Furthermore, the ambiguities in the detail of the original system were repeatedly pointed out; and for objective treatment of the test it became quite necessary to give up such unreliable distinctions. For present purposes, the proper evaluation of the test is in terms of its egocentricity and this is best served in the formulation of an *egocentric* category of responses as opposed to a *concrete* one; though in the latter group a few distinctions, as of opposite and supraordinate responses are still conveniently preserved.\* The relation of these two major groups of responses constitutes the dynamic essence of the experiment.

I will not harrow you with mathematical detail, but there is no reason to doubt that this broad separation of concrete and egocentric associational categories is satisfactorily accomplished.<sup>1</sup> It was, in fact, possible to submit it to a very rigid objective test. We are fortunate in having in the English language a definite standard of normality for a special material, along the precise lines here indicated. How personal is an associative response is naturally measured by how individual it is to the particular person; and this we know to the limit of a thousand individuals, as determined by Kent and Rosanoff. Correlating the results of two separate series of experiments, evaluated by the two methods, the Pearson coefficients in each case approximated 74 per cent,

\* A Preliminary note on the Categories of Association Reactions, *Psychol. Rev.* 18, 1911, pp. 229-233.

<sup>1</sup> The Question of Association Types, *Psychol. Rev.* 19, 1912, pp. 253-270. Cf. also Fürst, *Statistische Untersuchungen über Wortassoziationen und über familiäre Uebereinstimmung im Reaktionstypus bei Ungebildeten*. *Journ. f. Psychol. u. Neurol.* 9, 1907, 243-278.

differing by only .3 of 1 per cent; and this relationship had to be calculated on the basis of the original predicate category; it would be distinctly closer under the present formulation of the egocentric.\*

Dynamically therefore, these two methods of dealing with the free association experiment represent the same thing. We may discuss the data now from one, now from the other standpoint. The advantage of the latter is its strict objectivity; of the former that it is available in long and diverse series of stimulus words, which renders it more applicable to the study of changes in reaction type, whether the result of practice,<sup>•</sup> emotional incidents (Tatbestandsdiagnostik) or the course of mental disease.

The influence of education upon the reaction type has usually been formulated in terms of internal and external associations. This distinction is very dependent on the personal equation of the investigator, but there has been substantial agreement that education favors a more external association type, which roughly corresponds to a more concrete one. On the other hand, the predicate category tends to be more numerous in Jung's educated subjects, and the recent and more objective evidence adduced by Kent and Rosanoff is that the individuality of response is very distinctly greater in the educated. But all such findings are true only of averages from many subjects, between whom there is such great individual difference that this criterion can readily be proved of little or no significance in judging educational status beyond quite low levels. It is just this independence of education that gives the experiment its value in relation to things more important than education in its present conception.

In the persons observed by the writer a more definite line of cleavage appears between the men and women. The greater affective sensibility of women postulated as a fundamental difference shows itself, quite as one would expect, in a greater frequency of egocentric, personal types of response. This is true whether one considers the responses along Aschaffenburg-Jung-Riklin lines, or by the frequency tables of Kent and Rosanoff. These investigators do not, it is true, report so marked a difference as is here found, but this may well be due to the less evolved

\* *Ibid.*, esp. p. 268.

• Practice Effects in Free Association. *Am. J. Psychol.* 22, 1911, pp. 1-13.

methods of treatment employed in the more groundbreaking researches. While there are always marked individual differences, yet the grouping here is so distinct that not one in ten of the men has more predicate reactions than the average of the women, and but one in six<sup>10</sup> a greater individuality of response.

But such group differences are important only as they make clearer the meaning of the reaction type in the individual case. That there are inherent differences of association type between various persons is quantitatively determined. What are the features in personality of which the association type is the expression? Sometimes they are strikingly clear; as exquisite a character-sketch as I have seen was once made by the speaker whom I have the honor to follow, from two records of the Kent-Rosanoff experiment, about an individual he had never met. To deal adequately with the question requires independent and comparative accounts of personality and measurements of association type. To this end is an effort to review my original data—the data that suggested this problem—and to learn how far the personalities of the subjects, as reflected in the best available common source of information, are related to characteristics of association type.

The most accurate determinations of association type at hand<sup>11</sup> consist of reactions by six subjects to 1000 different stimulus words each, and of two subjects to 500 each. The situation here shows three subjects high in the scale of egocentricity, the remaining five having about half as much tendency in this direction. We may designate the subjects by the alphabetical letters A, B, C, etc. The three egocentric types are A, D and G. The best available informant as above, not a psychologist, considers the subjects in relation to a complex of characters, to be summed up, according to the issues previously formulated, as conscientiousness, sense of responsibility, self-consciousness, depth of emotional life, tendency towards idealization as opposed to matter of factness. Taking the best-defined personality G, as the starting point, it is questioned which of the entire group resembles this subject most. No great resemblance appears at first sight, but the final judgment is A. They are much the closest in experimental type. As to who resembles G most with A excluded, the judgment

<sup>10</sup> The Question of Association Types, *Psychol. Rev.* 19, 1912, *esp.* p. 259.

<sup>11</sup> *Ibid.*, *esp.* p. 265. The subjects are not designated by the same letters.

is pretty decided on D, as is again the case in experimental type. In the writer's judgment, subject of course to distortion by knowledge of the experiments, the personality of G represents considerable subjective difficulties, extremely well dealt with; in A and D the difficulties are not so acute, but not so well managed. In further question of the subject resembling G the least, subject C is promptly selected, who combines a very objective type of association with very short reaction times. But inquiry whether the remaining subjects more resemble C or A, D and G brings the judgment that they more resemble A, D and G, whereas in association type they more resemble C. Also contrary to the present treatment of the experiments, subject D seems to the writer to more closely resemble G than A does.

Analogous data were sought for subjects in Kent-Rosanoff experiments.<sup>11</sup> Eight subjects are also involved here, but only A, D and G are the same as before, the others different persons. For these three subjects the results are in accord with those spoken of above. The question of the ways in which A and G most resemble each other brings the judgment of special similarity in "temperament," refinement, conscientiousness. The most important difference seems to be that A's judgment is much inferior to G's. These are, of course, the subjects highest in the scale of egocentricity. The two subjects showing responses of most usual character are next considered; it appears that a difference lies between them in that more self-confidence enables the one to do better work. The question of how these two subjects, J and L, the most objective experimental types, differ from A and G, the most egocentric types, brings the quick reply that they are "an entirely different type" of person, but no topics are elaborated, it "does not seem as though they had had the same bringing up." Almost midway in the scale of Kent-Rosanoff usualness in response is subject K. As this subject was otherwise known to have an exceptionally good personality, inquiry was made as to points of difference from A and G, and from J and L. In respect to the complex of qualities above named, this subject was thought to resemble A and G the more, as is most decidedly the case in association type, when it is considered by Aschafenburg-Jung-Riklin methods. In Kent-Rosanoff treatment the

<sup>11</sup> *Ibid.*, esp. p. 259.

position is as noted about midway, though slightly nearer A and G. The main difference from A and G is thought to lie in a lesser emotional depth. With respect to the quality-complex, the three middle subjects of the group, K, M and N, also resemble each other more closely than they do those at the usual end, J and L, or those at the egocentric end, A and G.

It would seem scarcely just to make no mention in this connection of a series of specially designed supplementary experiments, though their data are too recently gathered to permit description of other than their most general features. The individuals concerned were selected for temperamental relationship to C, an extreme objective type, or to G, an extreme egocentric type, by a third person; the writer being slightly acquainted with but one of them, and not knowing what group they were supposed to represent until the experiments had been evaluated. There has yet to be observed a case of the G personality whose association type is not above the average in respect to both individuality of response and the proportions of the egocentric category. On the other hand there are mechanisms which may produce in a C personality a reaction to the experiment very similar to the G type, by present methods of evaluation. It is only too certain that frequency of response by the Kent-Rosanoff tables does not express the affective differences in the two types. Affectively determined responses are naturally individualized, and fall into the egocentric category; but it is not conversely true that this type of reaction is necessarily, or perhaps even usually, of affective implication. We have simply not yet learned to distinguish objectively two kinds of egocentric responses that represent fundamental differences in the personalities to which they attach. A low individuality of response, with a low proportion of egocentric reactions, have hitherto been found in personalities of more superficial affective life; but the opposite association type has been observed in individuals of both extremes.

Careful introspection, a renewed attempt at further analysis of the egocentric category, the galvanometer and its congeners, control experiments from other mental fields—all are at hand to aid in clearing up this situation. Before us is the issue of the experimental study of personality through the stream of thought as given in the association procedures. Also the general direction

in which the issue seems most likely to lead. And if the problem is one of exceptional difficulties, there are few indeed towards which we can direct such perfected engines of attack.

Those who indict these pages with the high treason of teleology, I have but to remind that the criterion of science is one of method rather than of *Fragestellung*, and again that the special method under discussion yields to few psychological procedures as a quantitative instrument. The science that undertakes the study of any class of natural phenomena is responsible for the problems of those phenomena in relation to human life. Neither the physicist, nor the chemist, nor the pathologist evade them; and it is for us to determine that psychology be not forever dominated by a complex of futility. The psychologist who would square his work with the test of concrete experience must rally to other standards, such as are raised by my own teacher, Cattell, and here, by Watson. With the utmost satisfaction therefore, let every psychologist to whom there is value in progressive interaction with liberal psychiatric thought, contemplate the auspicious circumstances that have brought us together.

## A STUDY OF THE NEUROPATHIC INHERITANCE.\*

By F. W. MOTT, M. D., F. R. S., F. R. C. P.,

*Pathologist to the London County Asylums and Director of the Pathological Laboratory; Senior Physician, Charing Cross Hospital.*

*Mr. President:* Permit me, on behalf of myself and my fellow British workers in psychiatry, to thank you for the great honor of being asked to give an address at the opening of the Phipps Psychiatric Clinic; an institution destined in the future to add new laurels to the medical faculty of this great university, which has obtained a foremost place in the world of medical science by spreading the light of research by its distinguished professors to all parts of the new world, and even by vivifying the medical faculty of an ancient university.

When your distinguished director, Dr. Meyer, wrote to me asking the subject of my address, I replied "A Study of the Neuropathic Inheritance, Especially in Relation to Insanity." The reason why I chose this subject is because for the past four years I have been engaged in the study of the relation of heredity to insanity. I feel that the subject is one which still requires an enormous amount of patient investigation before any definite conclusions can be arrived at, and the more I am convinced of the wisdom of following the advice of Bacon in his "Advancement of Learning, Divine and Human," when he says: "First, therefore, in this, as in all things that are practical, we ought to cast up our account, what is in our power, and what not; for the one may be dealt with by way of *alteration* and the other by way of *application*. The husbandman cannot command either the nature of the earth nor the seasons of the weather; no more can the physician the constitution of his patient, nor the variety of accidents; so, in the culture and cure of the mind of man, two things are without our command—points of nature and points of fortune."

\* Address delivered at the opening exercises of the Henry Phipps Psychiatric Clinic, The Johns Hopkins Hospital, Baltimore, Md., April 16-18, 1913.

## INVESTIGATION OF RELATIVES IN THE LONDON COUNTY ASYLUMS.

Four years ago I initiated a card system of relatives who are at present or who have been in the London County Asylums; the reason for doing so was to collect material for ascertaining resemblances in the convolutional pattern of the hemispheres in the brains of related persons. A large number of brains have now been collected and we are gradually duplicating these. Dr. Edgar Schuster has carefully examined and reported on the brains of a mother and daughter and of two brothers. His long and valuable communication, embodying careful measurements of the fissures and drawings to illustrate the facts, will be published in the next volume of the archives of my laboratory. He has demonstrated that many points of similarity exist, showing that the organ of mind has an hereditary physiognomy, as had been previously shown by Karplus, with the brains of infants. When a large number of these brains are duplicated some interesting results may be anticipated.

From a few hundred cases at the commencement of my enquiry, the list has now increased to nearly 3500 cases. Each card states the patient's name, age, age at first attack, age on admission to particular asylum, and nature of mental disease. Males have a blue card, females a buff card, and there is one for each insane relative in a fraternity or family, and the name of each insane relative of the fraternity or family is entered with all particulars on each card. The cards are sent to the various asylums to be filled in with any further information that can be obtained.

If the organization of this system has done nothing else it has stimulated interest in the subject of heredity in relation to insanity, and the Asylums Committee were much impressed when they heard that at the present time there are resident in the London County Asylums over 1500 relatives or persons who were related to one another or who had had relations previously in the asylums. Still more were they impressed by the fact that there are about 730 persons so closely related as parents and offspring, brothers and sisters, at the present time in the London County Asylums. *A priori*: this, to my mind, is striking proof of the importance of heredity in relation to insanity, for we cannot suppose that

20,000 people out of the four and a half millions in the county of London brought together from some random cause would show such a large number closely related as 3.6 per cent.

The committee invited me to give a lecture before the County Council on the subject of heredity in relation to insanity. I was glad to do this, because I knew that if the medical officers saw that the committee were interested in this subject they would be impressed with the fact that it would be to their advantage to assist in the work. So I have been able to collect a number of pedigrees on a system which I shall shortly explain, obtained for me by the medical officers in some of the asylums.

The information necessary to construct these pedigrees was obtained from the friends who visited the patients, but they have been supplemented by further investigation by myself or my own assistants; and as far as possible every endeavor has been made to make as complete a record as possible for three or more generations; for I recognize the fact that it is far more important to obtain a few complete pedigrees than a number of incomplete ones.

The method of selecting cases for enquiry has been such as to avoid, if possible, any undue preference being given to any hypothesis or propaganda. The cases have been chosen because the friends were intelligent, numerous, and able and willing to give as complete an account as possible of the members of the stocks.

Before I refer to the results obtained by these investigations let me call your attention first to some of the statistical results obtained by the card system; and I hope to show, later, that the principal facts deduced from the statistics are supported in every way by the results obtained by the analyses of the pedigrees.

I soon recognized that the records in the case books referring to the diagnosis of the form of insanity at the various asylums at different periods of time would form unreliable data for the following reasons: (1) The personal equation of the medical officers; (2) the different classifications of insanity and nomenclature adopted in different asylums at different periods of their existence; (3) the change in the diagnosis after admission. Consequently I have only placed reliance on such well recognized conditions as epilepsy and general paralysis of the insane concerning

which the personal equation cannot greatly affect the diagnosis, particularly in relation to the latter, in which the diagnosis is, in the great majority of cases, controlled by postmortem examination. I judged that the personal equation, however, could not materially vitiate the data referring to the age at first attack, discharge from asylum, death, and recurrence of attacks as shown by dates of readmissions.

My statistical observations by the card system of relatives, therefore, mainly relate to the collection and analysis of those data which the personal equation does not materially affect. A criticism has been made that in days gone by fewer people who were insane were admitted to asylums and this factor would affect the age of first attack of parents and grandparents more than their offspring. The main bulk of the cards, however, refer to parents and offspring admitted to the asylums within the last 15 years, and I shall give other reasons why this does not materially affect the results.

ANALYSIS OF 3485 RELATED CASES (INSTANCES OF TWO OF A FAMILY INSANE).

	Pairs.	Cases.
Mother and daughter .....	174	348
Mother and son .....	108	216
Father and daughter .....	112	224
Father and son .....	83	166
Brothers and sisters .....	241	482
Two sisters .....	227	454
Two brothers .....	150	300
Husband and wife .....	76	152
Offspring and grandparents .....	29	58
Other relationships, collaterals, etc. ....	224	448
 Total .....	1424	2848
 160 instances of 3 of a family insane.....		480
27 " " 4 " " "		108
6 " " 5 " " "		30
2 " " 6 " " "		12
1 " " 7 " " "		7
 Total .....		3485

Total, 3485 cases made up from 1620 families.

They show the following facts:

- (1) In the insane offspring of insane parents daughters are much more numerous than sons.
- (2) Amongst insane members of the same family (brothers and sisters) sisters are more numerous than brothers.

This may be correlated with the fact that more women are in the asylums than men. About one-half of the people in the London asylums at the present time have, according to an admirably lucid report of the clerk to the Asylums Committee, been resident more than ten years. The silting up in the London asylums at the rate of 125 to 200 per annum is largely due to women. There are several causes for this: the recoveries in women do not bear the same proportion as in men; general paralysis, which is a fatal disease, is at least four times more frequent in men than in women. Now, why should women be more liable to become insane than men? I will briefly summarize the causes which, in my opinion, are operative:

The physiological emergencies connected with reproduction, *i. e.*, the menstrual periods, child-bearing, and the cessation of the period of reproduction, the climacterium; moreover, there is an inborn more unstable mental equilibrium in women. I would also add as an important, and perhaps the only, cause in many instances—the enforced suppression by modern social conditions of the reproductive functions and the maternal instincts in women of an inborn emotional temperament and mental instability.

#### ANTICIPATION OR ANTEDATING.

Dr. Maudsley has observed that nature tends to mend or end a degenerate stock. Now, how could nature best end or mend a degenerate stock? By segregating in a relatively few germs all the unsound elements, leaving the others free—as it were, a crystallization out of the diseased elements. What would this do? you may ask. Well, it would make some of the offspring so weak by intensifying the disease and bringing it on at an earlier age that they would, if left to nature's process of elimination, be killed off early, or unfitted for propagation by being brought into the asylums at adolescence. This was termed by Darwin "antedating" or "anticipation," and I have found that there is

a signal tendency in the insane offspring of insane parents for the insanity to occur at an earlier age and in a more intense form in a large proportion of cases; for the form of insanity is usually congenital imbecility, epilepsy, adolescent insanity or the primary dementia of adolescence, which is generally an incurable disease. This is statistically shown in the figures regarding the age at the time of first attack in the insane offspring of insane parents. You will observe that nearly 50 per cent of these insane offspring had their first attack of insanity at or before the age of 25, and whereas in the case of the insane parents advancing age apparently brings greater liability to insanity, in the case of offspring, with advancing age the liability to insanity tends rapidly to diminish. Now besides the fact that this shows nature's method of eliminating unsound elements of a stock, it has another important bearing, for it shows that after the age of 25 there is a greatly decreasing liability of the offspring of insane parents to become insane, and therefore on the question of advising marriage of the offspring of an insane parent this is of great importance. Sir George Savage recently said in his presidential address to the "Psychiatric Section of the Royal Society of Medicine" that this statistical proof of mine accorded with his own experience, and that if an individual who had such an hereditary taint had passed the age of 25, and never previously shown any signs, he would probably be free, and he would offer no objection to marriage.

Pedigrees and statistical data relating to antedating appear to show an intensification and anticipation by a coalescence or crystallization out of the unsound germinal determinants into a few of the offspring, leaving the germ plasm of the others free. This would not only purify the stock by segregation, but the diseased offspring would be unfit for the struggle for existence and propagation. In putting forward this theory of coalescence of similar diseased germinal determinants, I may mention in support of it a statement made by Galton in his great work on natural inheritance. "In the process of transmission by inheritance elements derived from the same ancestor are apt to appear in large groups, just as if they had clung together in the pre-embryonic stage, as perhaps they did."

STATISTICAL DATA RELATING TO INHERITANCE AND INSANITY,  
ESPECIALLY IN RELATION TO ANTICIPATION.

From an investigation of the age at the time of first attack in 508 pairs of parent and offspring (from the records of 464 insane parents of 500 insane offspring) the following table has been compiled. The figures denote the percentage of cases whose first attack occurred within the given age-periods.

Age-periods.	Father.	Offspring.	Mother.	Offspring.
Under 20 years .....	1.4	26.2	0.6	27.8
20-24      "	0.4	18.0	3.4	15.7
25-29      "	1.4	18.0	4.4	18.2
30-34      "	9.6	13.0	7.8	13.4
35-39      "	11.5	7.3	9.2	10.0
40-44      "	9.2	6.4	10.3	5.8
45-49      "	14.3	6.0	12.0	3.7
50-54      "	17.5	0.9	12.3	2.4
55-59      "	13.8	3.7	14.0	1.7
60-64      "	10.1	—	11.6	1.3
65-69      "	5.0	—	8.8	—
70-74      "	4.6	0.4	3.1	—
75-79      "	0.4	—	1.3	—
80      "	0.4	—	0.6	—

Adolescence.

Involutional period.

These figures are shown graphically in the following diagram (Fig. 1), the abscissæ representing the age-periods and the ordinates the percentage of cases whose age at the time of first attack falls within the given periods. They clearly show the signal tendency to the occurrence of most of the insanity in the offspring of insane parents at a much earlier age than in the parent; that is to say, antedating or anticipation is the rule.

Investigating the ages at the time of first attack in the insane offspring of insane parents, I find in the following pairs that 239, or 47.8 per cent, out of 500 offspring had their first attack at or before the age of 25:

Mother—son .....	51	out of 118 offspring.
Mother—daughter .....	81	" 170 "
Father—son .....	45	" 90 "
Father—daughter .....	62	" 122 "

— — — — —  
Total ..... 239 out of 500 offspring = 47.8 per cent.

The following table shows the average age at the time of first attack in the parent and offspring:

	Parent.	Offspring.
120 pairs mother—daughter .....	49.7	29.3
67 " " mother—son .....	50.2	30.7
76 " " father—daughter .....	50.1	30.4
51 " " father—son .....	51.9	33.1
79 parents, 133 offspring in families with more than two insane .....	47.7	28.7
Total: 393 parents, 427 offspring...	49.7	30.0

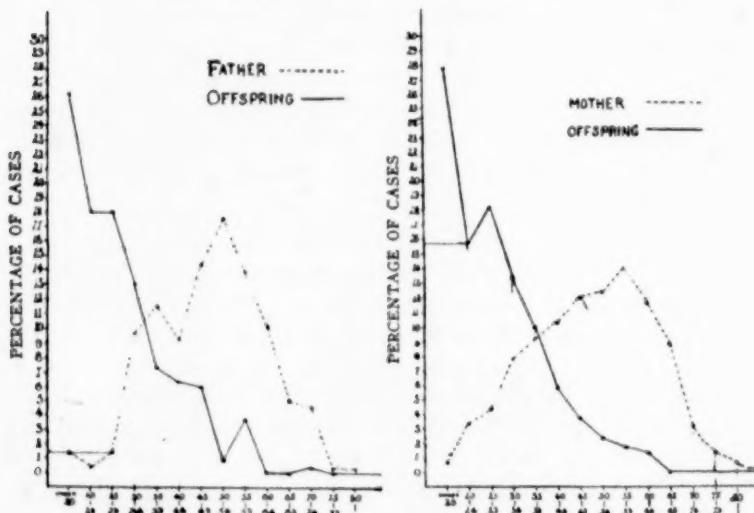


FIG. L

A comparison of these two curves shows a notable difference in the dotted line curves of the two parents. The curve of the mothers rises steadily and progressively from 20-55. The curve of the fathers does not commence to rise till after 25; there is a small peak at 35-39. This is the period when general paralysis is most likely to occur. But the main difference in the curves of fathers and mothers is due to the incidence of child-bearing, which causes the steady rise to the climacterium in the maternal curve.

In addition there were 71 parents whose average age was 49 at the time of first attack who were associated with imbecile offspring.

Lastly, I find that in 299, or 59.8 per cent, of the 508 pairs of insane parent and offspring, the first attack in the offspring occurred at an age 20 or more years earlier than in the parent; of these 299 instances 73 of the offspring were imbeciles.

Prof. Karl Pearson, writing to *Nature* November 21, 1912, "On an Apparent Fallacy in the Statistical Treatment of 'Antedating' in the Inheritance of Pathological Conditions," criticises on mathematical grounds the evidence of anticipation. I do not feel myself competent to reply to the opinion of such an eminent authority on mathematics applied to biometrics, but it does not militate against my conclusions nor explain away the fact that

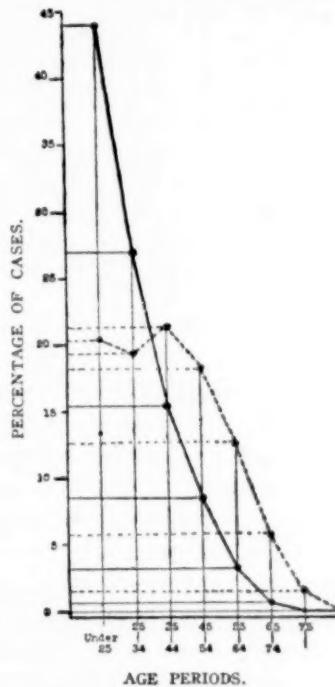


FIG. II.

a large proportion of the insane offspring of insane parents are affected with imbecility or adolescent insanity, for, granting the assumption that there is no antedating at all, we might rightly expect the ages at onset of the insane offspring of insane parents to be comparable with the ages at onset of all the admissions to the asylums during the same period. This is by no means the case, for amongst the insane offspring there is a far greater proportion affected in early life, as is shown by the following figures and curves.

PERCENTAGE COMPARISON OF THE AGE AT THE TIME OF ONSET OF INSANITY  
IN THE INSANE OFFSPRING OF INSANE PARENTS, AND THE GENERAL  
ADMISSIONS TO THE LONDON COUNTY ASYLUMS.

Age.	Males.		Females.		Total.	
	4482 direct admissions during last four years.	274 insane offspring of insane parents.	5097 direct admissions during last four years.	389 insane offspring of insane parents.	9579 direct admissions during last four years.	663 insane offspring of insane parents.
Years.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Under 25...	20.0	43.8	20.2	44.2	20.1	44.0
25 to 35....	19.9	27.7	19.9	28.0	19.9	27.9
35 to 44....	21.9	13.8	21.5	16.7	21.7	15.5
45 to 54....	17.7	10.2	18.6	7.4	18.2	8.5
55 to 64....	13.3	3.6	12.4	2.8	12.7	3.2
65 to 74....	5.7	0.7	5.9	0.8	5.8	0.7
75.....	1.5	....	1.6	....	1.5	....

41 male imbeciles out of 274 offspring; 54 female imbeciles out of 389 offspring; 95 male and female imbeciles out of 663 offspring.

The following points are indicated upon examination of these tables:

1. The average age incidence of male and female general admissions for each decade is almost identical. This seems to show that the larger number of females in our asylums is due to accumulation and probably may in great measure be correlated with the fact that the death-rate of males from general paralysis is nearly eight times as great as that of females.
2. The female offspring of insane parents show a slightly greater incidence early in life than the male, the most marked difference being in the early involutional period, 35-44 years.
3. Taking the total offspring, the male and female separately, there is a far greater incidence of insanity early in life especially under the age of 25 years; and of the 663 insane offspring of insane parents examined 95 or one-seventh were imbeciles.

I may say that the examination of pedigrees first led me to regard antedating as nature's method for eliminating the unfit, and the pedigrees, which are numerous, that I have since obtained, all strengthen the opinion. I hope shortly to publish a large number of these pedigrees and further elaborated statistics on the question of antedating, obtained from a further collection of data since the above figures were obtained.

Prof. Pearson in one way does not deny the fact that there is a tendency for an insane stock to be either ended or mended, which is really an important practical point we have to decide, for he says: "In the case of insanity, is the man or woman who develops insanity at an early age as likely to become a parent as one who develops it at a later age? I think there is not a doubt as to the answer to be given; those who become insane before 25, even if they recover, are far less likely to become parents than those who become insane at later ages; many, indeed, of them, considering the high death-rate of the insane, will die before they could become parents of families."

Mr. Nettleship has shown that antedating occurs in other diseases, notably diabetes, and it was he who called my attention to the probability of my being able to show antedating in insanity, because I remarked that I seldom found insanity occurring in pedigrees beyond three generations; there was a tendency to elimination of the unsound members by early death.

Erasmus Darwin, the grandfather of Chas. Darwin and Francis Galton, said: "As many families become gradually extinct by consumption, epilepsy, mania, it is often hazardous to marry an heiress, as she is often the last of a diseased family." In a letter to the father of Chas. Darwin, probably prompted by the fact that one of his sons committed suicide, he wrote: "I know many families who had insanity on one side, and the children, now old people, have had no sign of it. If it were otherwise there would not be a family in the kingdom without epileptic, gouty or insane people in it." Francis Galton, his other distinguished grandson by his second wife, established the law of filial regression, or the tendency continually operating to re-establish the normal average of the race. It is remarkable how this progenitor of our two greatest biologists anticipated the epoch-making discoveries of his illustrious grandsons.

## PEDIGREES SHOWING ANTICIPATION.

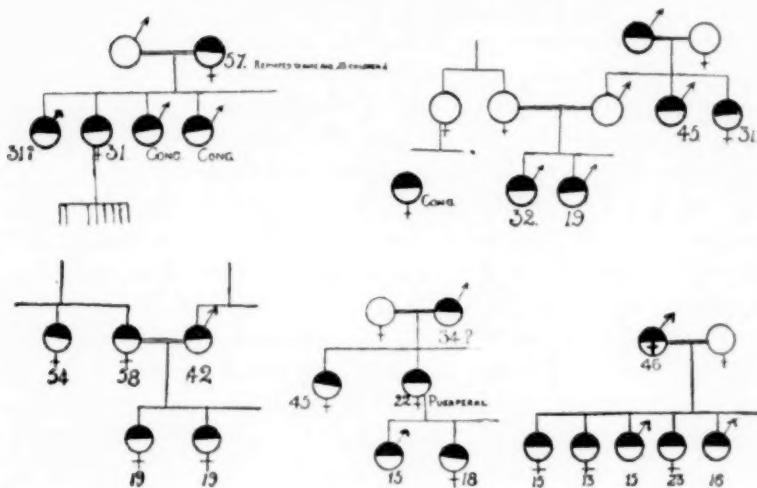


FIG. III.

The above pedigrees illustrate extreme cases of hereditary transmission of the neuropathic taint. These with Figs. IV, XVII, XX represent the instances of five to seven members of a family being at one time or another resident in the London County Asylums.

They illustrate "antedating"; the insanity of the offspring is shown to occur at a much earlier age than in the parents.

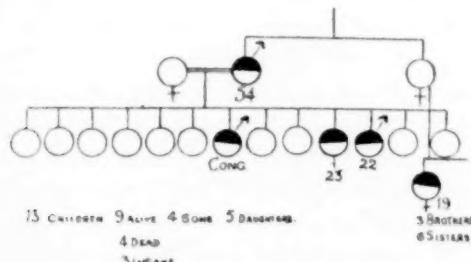


FIG. IV.

A. B.—, an alien Jew, aged 54, was admitted to an asylum for the first time suffering with involutional melancholia; he has a sister who has not been in an asylum, but, as events turned out, bore the latent seeds of insanity. The man is married to a healthy woman who bore him a large family; the first five are quite healthy, then comes a congenital imbecile epileptic (cong.), then two healthy children, followed by a daughter who becomes insane at 23, then a son insane at 22, and lastly, two children who are up to the present free from any taint. The sister of A. B.— is married, and has a family of ten, seven girls and three boys; one of the females was admitted to the asylum at the age of 19, and since this pedigree was constructed a brother of hers has been admitted, aged 24. Half-black circles are insane. This pedigree is instructive; it shows direct and collateral heredity; it also shows remarkably well the signal tendency to the occurrence of insanity at an early age in the children of an insane and potentially insane parent.

Each pedigree is a study in itself and therefore any endeavor to frame statistics regarding the influence of a particular inheritance may be full of fallacies; nevertheless, I have endeavored to frame statistics from a number of pedigrees which have been collected; naturally these pedigrees are of unequal value and

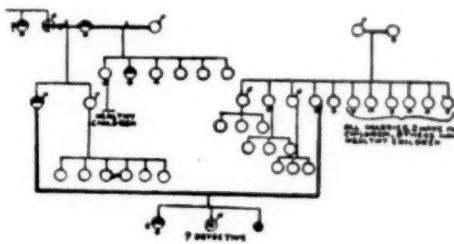


FIG. V.

This pedigree commences with an insane woman who first marries an apparently healthy man, and of their six children one becomes insane. She next marries a drunkard whose sister is reported to be insane. The result of this marriage was a weak-minded son, who came into the asylum at 42 years of age, and an apparently normal son, who marries and has healthy children. The insane son married a woman coming from a good stock, with the result that their firstborn daughter is an imbecile, and the second born, a son, is mentally defective.

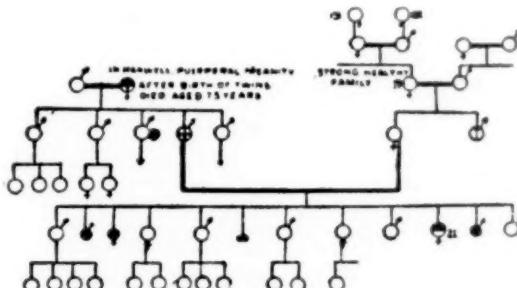


FIG. VI.

In the above pedigree is shown the mating of a female descendant of a strong, healthy family with longevity to the drunken son of a drunken mother, who also had an attack of puerperal insanity. Of the children from this marriage three died young; *the one affected member became insane in adolescence and has died of tuberculosis in the asylum* (half-black circle), whilst the remainder are apparently healthy, and those who are married have healthy children.

therefore the results can only be regarded as purely approximate. Still, admitting these fallacies, they may serve as a general indication regarding probability of transmission of insane inheritance. The much greater incidence when there is a dual inheritance over a single inheritance is quite in accordance with ex-

pectations, but many pedigrees which I shall show, or I have already shown, prove that this is by no means invariably so in every individual case. Again, in the comparison of insanity in the offspring where there is direct or collateral inheritance, the statistics accord with expectations, but here again many pedigrees

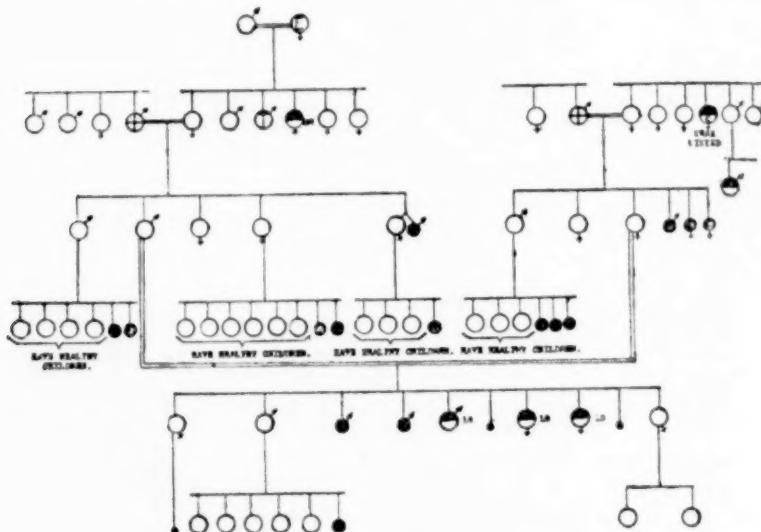


FIG. VII.

Pedigree of 5 generations relating to 3 patients, two sisters and a brother admitted to Hanwell suffering with dementia praecox; onset of all three was approximately 18; they are still in the asylum. All the other living members have been seen and are quite normal.

The eldest married; had only one miscarriage. The eldest son has six children, 5 living, some grown up and normal. The youngest daughter married and has two normal children, aged 4 and 2 years.

The father and mother were both life abstainers. The father's cofraternity and their offspring are quite normal, but on his father's side there is a history of drink and on his mother's collateral insanity and epilepsy in the grandmother. On the mother's side, in her generation, there is no insanity or epilepsy but her father was an alcoholic, and on her mother's side there was collateral insanity.

It seems that the mating of these two potentially unsound stocks intensified the neuropathic taint which revealed itself in an active form in these cases of adolescent dementia. All the other matings have led to the production of healthy children, and it is probable that with the elimination by "anticipation" of the three unsound members the stock under ordinary favorable conditions may return to the normal average.

show remarkable exceptions to this general rule of the much greater incidence in the former.

These figures, however, may serve to afford further proof of the coalescence and segregation of the unsound elements of the germ plasm. The pedigrees which I have so far collected do not

prove that Mendelian proportions exist, and this is not surprising, seeing how many and varied are the exciting causes entering into the production of insanity, feeble-mindedness and epilepsy. Moreover I have examined a number of families in which one parent was an insane epileptic, and yet in some instances none of the offspring were affected with epilepsy or insanity, and I could discover no certain evidence of Mendelian proportions. The epileptics in the London County Asylums may be of a different

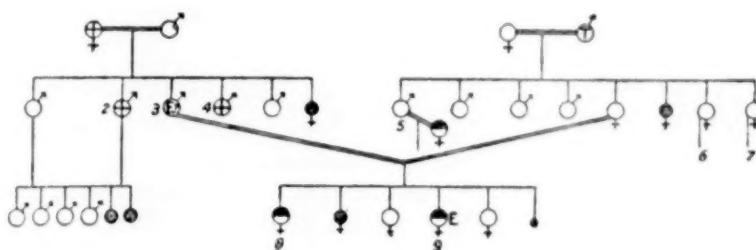


FIG. VIII.

The above pedigree shows the intensification of the neuropathic taint in a stock with the elimination of the two affected members by adolescent insanity. No. 1, the grandmother, was alcoholic, and died at the age of 40. Of her children, Nos. 2, 3, and 4 were alcoholic, excitable, and violent. No. 3 "had stupors like No. 9," and eventually died from tuberculosis at the age of 36. His wife came from a comparatively good stock as shown by the fact that Nos. 5, 6, and 7 have healthy children and grandchildren, in spite of the fact that the wife of No. 5, about twenty years ago, was a resident of Banstead Asylum for a period. Of the children of No. 3: No. 8, a girl, was certified at the age of 16, and died in Claybury Asylum from tuberculosis at the age of 21. No. 9, her sister, was subject to fits, and was admitted to Claybury Asylum at the age of 21, where she is still resident. The other two sisters are exceedingly nervous and emotional, and one has been admitted to the asylum since this pedigree was made.

type to those in the asylums under the charge of the Metropolitan Asylums Board, for I find that, as a rule, feeble-mindedness does not figure largely in their pedigrees; not more than other forms of insanity.

#### SINGLE COMPARED WITH DUAL NEUROPATHIC INHERITANCE.

1. The analysis of families with a double inheritance, represented by insanity, epilepsy, suicide, nervous disease, in both paternal and maternal antecedents, direct or collateral, within two generations.

#### 25 FAMILIES EXAMINED.

No. of Children.	No. died young.	Insane, suicide, nervous disease.	Apparently normal.
154	20	46	88

34.3 per cent of the offspring reaching adult age were affected.

2. The analysis of families in which there was an inheritance on one side only.

193 FAMILIES EXAMINED.

No. of Children.	No. died young.	Insane, etc.	Apparently normal.
689	52	43	594

6.7 per cent of the offspring reaching adult age were affected.

DIRECT COMPARED WITH COLLATERAL NEUROPATHIC INHERITANCE.

1. The analysis of families with a direct inheritance, represented by insanity, etc., in the parent.

63 FAMILIES EXAMINED.

No. of Children.	No. died young.	Insane, etc.	Apparently normal.
304	27	61	216

22 per cent of the offspring reaching adult age were affected.

2. The analysis of families with a collateral inheritance, represented by insanity, etc., in the maternal or paternal aunts and uncles.

91 FAMILIES EXAMINED.

No. of Children.	No. died young.	Insane, etc.	Apparently normal.
354	28	12	314

3.6 per cent of the offspring reaching adult age were affected.

Before passing on to the investigation of heredity in relation to insanity by the collection of pedigrees it would be well to state what I mean by the term "Neuropathic Inheritance."

THE NEUROPATHIC INHERITANCE.

TEMPERAMENT AND HEREDITY.

Just as bodily features are transmitted from one generation to another, so is temperament. The inborn raw material of character is the complex sum total of the fixed and organized characters of the species and the sex modified by especial racial and family characters. The former are dependent upon complexes of primitive states of feeling and cognition, based upon the appetites and desires and the appropriate instinctive reactions for their

satisfaction, thereby ensuring the preservation of the individual and the species. The instinctive reactions are associated with concomitant primitive emotional states of feeling and objective manifestations peculiar to the sex and the species. The oldest phylogenetically, they are common to all human beings and are the mainspring of all human action, and this fact has been poetically expressed by Schiller in the following lines:

Durch Hunger und durch Liebe,  
Erhält sich die Weltgetriebe.

The special racial and family characters are of later development, therefore are far less fixed, stable and organized in the nervous system, consequently are more liable to mutation.

A child is born into the world with inborn immutable and mutable characters derived from these genetic sources; of the importance of the inborn characters in future conduct there can be no doubt; in proof thereof I need only remind you of Galton's remarkable inquiry into the history of twins. He found that similar twins (developed from one ovum and therefore identical germ plasm) living in a different environment remained similar in temperament and character, while dissimilar twins brought up and living in the same environment remained dissimilar; these dissimilar twins, however, were the product of two separate ova with dissimilar germs.

Again, Galton, although he formulated a law of Ancestral Inheritance which appears to be contradictory to the accepted Mendelian Law, certainly recognized that the law only applied to masses of people, and not to individual cases, for he said: "Though one-half of each child may be said to be derived from either parent, yet he may receive a heritage from a distant progenitor which neither of his parents possessed as personal characteristics." Galton also made a statistical enquiry into the inheritance of good and bad tempers and his conclusions were that one set of influences tends to mix good and bad tempers in a family at haphazard; another tends to assimilate them, or that they shall all be good or all be bad; a third set tends to divide families into contracted portions. He showed that there is always a tendency to revert to the normal average of the race; the law

of filial regression. The older and more fixed a character is, the more liable is it to this law of filial regression.

A study of the neuropathic inheritance generally accords with Galton's enquiries on tempers. Still the subject which is of paramount importance and interest in heredity now is: Can Mendelism be applied to human characters? Professor Pearson says: "No evidence exists of Mendelian proportions occurring in the transmission of obvious human unit characters, *e. g.*, pigment and absence of pigment (albinism)." Professor Bateson does not affirm that it has been proved for human characters, although he believes that it exists, for he says: "Organisms may be regarded as composed to a great extent of separate factors by virtue of which they possess their various characters or attributes. These factors are detachable and may be recombined in various ways. It thus becomes possible to institute a factorial analysis of an individual. How far such analysis can be carried we do not yet know, but we have the certainty that it extends far and ample indications in supposing that we should probably be right in assuming that it covers most of the features, *whether of mind or of body*, which distinguish the various members of a mixed population like that of which we form part."

From such a representation we pass to the obvious conclusion that an individual parent is unable to pass on to offspring a factor which he or she does not possess. Since those individuals only which are possessed of the factors can pass them on to their offspring, so the offspring of those that are destitute of these elements (nulliplex) do not acquire them in successive generations, but continue to perpetuate the type which exists by reason of the deficiency.

Bateson has recently said: "It should be explicitly stated, however, that in the case of the ordinary attributes of man we have as yet unimpeachable evidence of the manifestation of this system of descent for one set of characters only, namely, the color of the eyes. Moreover, if the evidence as to normal characteristics of man is defective, which, in view of the extreme difficulty of applying accurate research to normal humanity, is scarcely surprising, there is in respect to numerous human abnormalities abundant evidence that a factorial system of descent is followed." This may be true for certain well-defined abnormalities, but as

applied to the inheritance of the neuropathic tendency, Mendelian proportions cannot be shown, according to my experience, and this is not surprising, considering the many forms in which it exists; and even if we take epilepsy, which is, perhaps, the most easily determinable of all conditions, yet there must be many undiscovered forms which would elude even an expert enquiry concerning the members of the stock affected.

Dr. Weekes and Dr. Davenport have recently published a remarkable paper on "The Inheritance of Epilepsy," which they claim shows Mendelism in the inheritance of this disease and imbecility. It is a research of great value, apart from theoretical considerations, on account of the number of pedigrees recorded, but their conclusions appear to me to be open to criticism. Schuster in a review states: "The inheritance of epilepsy and feeble-mindedness can be briefly stated as follows: Such very different conditions as epilepsy and feeble-mindedness must indicate some essential difference in the germ plasm, and the tables which the authors produce show a distinct tendency towards the specific inheritance of these two characters separately; thus the proportion of children who are epileptics born of parents who are both epileptic is higher than when one parent is epileptic and the other feeble-minded, and considerably higher than where both are feeble-minded." It seems to me that there is an inherent fallacy in assuming that epilepsy and feeble-mindedness necessarily own the same cause, viz., an absence in the gametes of one and the same germinal determinant or specific factor. It is assumed by these authors that the absence in the zygote of a particular factor or determiner necessary to ensure normal development occasions either feeble-mindedness or epilepsy. Individuals in whom it is absent are called nulliplex; according to the older terminology they would be styled pure recessives or homozygous with regard to the absence of this particular factor. Feeble-mindedness, however, is associated in all my pedigrees with all forms of insanity. Are we to assume that all forms of insanity are due to the absence of this determinant? The authors use the term "simplex" to describe the hetero-zygote. Simplex individuals are said to possess an intermediate mental status, though some are apparently normal. But, as pointed out by Schuster, it is nowhere precisely stated what are the symptoms of the "intermediate mental states."

Now, the majority of persons classified in their tables as simplex are either alcoholic or neurotic. Persons who are really normal are called duplex. They have the normal development determiner twice over or are homozygous with regard to its presence. If this theory be correct, as Schuster remarks, then when nulliplex mates with nulliplex one would expect to find all the offspring nulliplex. In other words, the children of parents who are both feeble-minded or epileptic should be all feeble-minded or epileptic themselves. Drs. Weekes and Davenport's own tables, however, show this not to be the case and certainly my pedigrees of epilepsy do not show this. When the Mendelian proportions are not borne out the authors endeavor to explain the fact in various ways; thus, when the nulliplex feeble-minded and epileptic offspring are in excess of expectation, the excess is accounted for by parental alcoholism. Schuster points out another and more obvious explanation, viz., the manner in which the material was collected, which had the effect of ensuring at least one epileptic in almost all the fraternities investigated.

"Like tends to beget like," but a collection of statistics and pedigrees merely relating to the existence in members of a stock of certified insanity or fits or weak-mindedness is quite inadequate for scientific purposes, as the neuropathic predisposition manifests itself in many different forms, and it is necessary to know something of the temperament and conduct of all the members of a fraternity and as many of the stock as possible to make scientific deductions of value; and this requires time and patient investigation by skilled persons unprejudiced by a propaganda or the desire to prove a theory or the application of a law.

It is very important to seek the first stages and less obvious conditions of degeneration in the stock. Morel, who studied this question more than 50 years ago, pointed out that nervous, irritable weakness, the neurotic temperament, neurasthenic predisposition may be the first evidence of degeneration of a stock. Investigation of pedigrees and the experience of the family physician and the alienist-specialist show that the inborn morbid temperament may be manifested in a variety of ways by the behavior and conduct observed in various members of the stock. The signs of degeneracy which may be exhibited are self-centered, narrow-mindedness in religious beliefs, fanaticism, mysticism, spiritism,

an unwholesome contempt for traditional custom, social usages and morality, a vain spirit of spurious art and culture, a false, self-loving vanity in pursuit of a sentimental altruism, or by eccentricities, anti-crusades and perversions of every kind, the intelligence being generally well preserved; such signs of a morbid temperament are often combined with talent and even genius, especially of the constructive, imaginative order; but the brilliant intellectual qualities of a degenerate are generally associated with either a lack of moral sense or of sound judgment and highest control. Nevertheless, these neuropathics often serve a useful purpose in their disregard of tradition and social usages. Time, chance, circumstance and opportunity play an especially important part in moulding and determining the career of members of a neurotic stock; circumstances and environment may favor one member, and he rises on the tide of fortune to an eminent position; whereas another, unfortunate or less fortunate, but with a similar inborn temperament, dies in an asylum or commits suicide in despair.

There can be no question but that the morbid irritability which many men of genius have manifested was but a defect of bodily derangement upon a sensitive mind. Byron, in one of his letters, said: "I am suffering from what my physician terms gastric irritation. My spirits are sadly depressed. I have taken a brisk cathartic and tomorrow Richard will be himself again." It is recorded that Voltaire and an Englishman after a long conversation on the evils of this world made a compact to die together the next day. The Englishman appeared and expected Voltaire to keep his promise, but the cynical genius thus expressed the change of his mental attitude: "Ah! Monsieur, pardonnez moi, J'ai bien dormi, mon lavement a bien opéré, et le soleil est tout à fait clair au jour d'hui."

In searching for the neuropathic tendency there are many possibilities of missing the inborn factor of a neurosis or psychosis, though a careful enquiry be made, even when aided by intelligent co-operation of the friends. It is necessary to enquire into the family life and conduct of the members of a stock to find the neuropathic taint. How often may it be observed that an apparently sound stock may in reality be unsound. Successful men in the eyes of the world may be really degenerates; not infre-

quently so-called self-made men form the first step in the process of degeneration. The selfishness and meanness or the cunning, avarice and moral guile by which they have succeeded in amassing a fortune for their children to spend selfishly is the first evidence of degeneracy; but whereas the parents to gratify their selfish desires succeeded by work and abstemiousness, the children, possessing the same selfish instinct, with no need to work, and

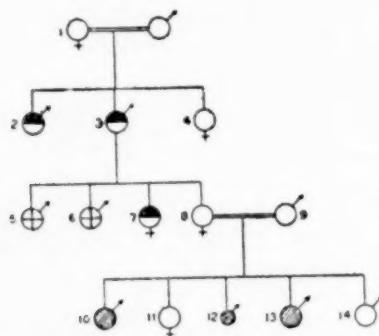


FIG. IX.

The above pedigree shows the transmission of insanity, immorality and violent temper. No. 1, the grandmother, was immoral; was found in bed with another man by her husband and son. Of her children, No. 2, an engine-driver, was "a man of violent temper who smashed things on a wholesale scale at home. He died with the delusion that he was going to heaven on the footplate of an engine." No. 3 was also a man with a violent temper, dangerous to himself and others, who eventually died from general paralysis. The daughter, No. 4, was criminally immoral; she had an illegitimate child, but no children by her marriage. The children of No. 3 are as follows: Nos. 5 and 6, both men with violent tempers, drunken and immoral; No. 7, a daughter, criminally immoral, who eventually was detained in Bethlehem for a period. No. 8 is a woman with a very violent temper, smashes things, and has attacked her husband with a poker, etc.; has tried to commit suicide by poison and once by hanging; gushes to every man, but repels her husband. The husband asks, "is she mad or bad, or both?" The husband is a healthy, robust man who comes from a good healthy stock. The children were five in number; two survive (Nos. 11 and 14), and these fortunately resemble the father; they are healthy, robust and energetic. The firstborn, No. 10, was a boy resembling his mother; he was nervous, reserved, lacked mental energy, and was prone to somnambulism and night terrors, which existed in his mother's family; he died under an operation at the age of 12. No. 12 was the image of his father, but died from measles when 10 months old. No. 13 was nervous and resembled his mother; at 19 months he died from whooping-cough.

supplied with wealth, acquire vicious habits and criminal propensities, and not infrequently terminate their careers in the madhouse or prison. At the same time I do not wish to lay too much stress upon inborn criminality. Imitation and suggestion play a large part, for an inborn virtue under evil surroundings may lead to the worst forms of vice. When pedigrees are constructed showing in successive generations numbers of criminals,

paupers and lunatics, are we quite sure that there has not been a continuance in successive generations of those social conditions that lead to crime and pauperism among such people?

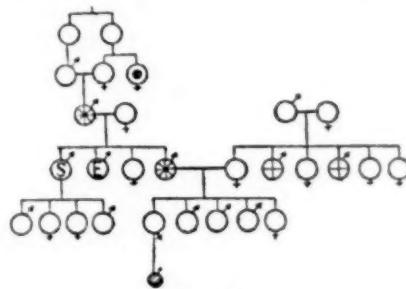


FIG. X.

A pedigree illustrating the marriage of first cousins. A genius was the result; he married a healthy woman, and their family consisted of an eldest son, a suicide; a second son, an epileptic; a daughter, healthy, unmarried; and a son, a genius. This man was a genius, but had an extremely well balanced mind; all his five children are healthy in spite of collateral inheritance on both sides. Circles with black centers, physically unsound. Circles in quadrants, alcoholism. Circles in octants, genius.

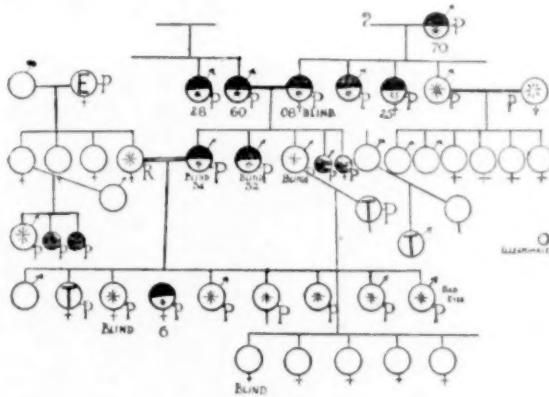


FIG. XI.

Fig. (XI) affords a good contrast to Fig. (X). The pedigree illustrates the marked transmission of insanity, pauperism and blindness. The stock is of a low type and it cannot be doubted that the majority of the individuals became paupers because they were not well enough endowed mentally and physically to compete successfully in life.

The pedigree has since been extended by Nettleship and Lidbetter. An association between mental deficiency and ocular defects is shown. The ocular defects are chiefly detachment of the retina, based upon disease of the choroid but with iritis and secondary cataract in some cases. They also noted antedating in the case of the insane members (Brain, 1913).

I have often found in the collection of pedigrees the association of insanity and suicide in a stock preceded by, or associated with,

the existence of individuals possessing the melancholic, suspicious, brooding, self-centered, hypochondriacal temperament; and it is not uncommon for suicide of one or more members of the stock in successive generations to occur. Associated with these temperamental evidences of degeneracy of a stock may be chronic

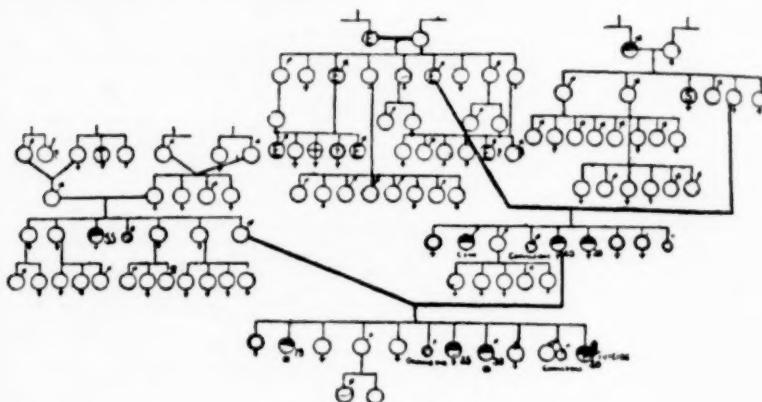


FIG. XII.

A very comprehensive and interesting pedigree obtained for me by Dr. Wilson White, showing the result of marriage of a nearly sound stock in which the temperament was, generally speaking, of the sanguine type; there was only one member insane at fifty-five, she was unmarried; her four sisters, who were all married, had some healthy, grown-up children. The brother himself, perfectly sane and healthy, married a woman descended from stocks in one of which there were many members suffering with epilepsy (E); indeed, her father and her grandfather suffered with it. On the maternal side there was suicide (S) of an aunt and insanity of a grandfather; most of the members of this stock were of a melancholy, brooding temperament. The result of the mating of these two neuropathic stocks is shown. There were nine children—of which three, marked with deep black-rimmed circles, suffered from some form of neurosis; a male congenital imbecile; a healthy male who has five healthy children; a child who died in early life of convulsions; the patient's mother who became insane at the age of 40; a female who became insane at the age of 20; two females also suffered with some form of neurosis; lastly, a male who died in early infancy. The next generation shows the result of mating this unsound stock with an almost healthy, sound stock. There are not as many unsound members as in the last generation, and we observe that the four members that became insane at the ages of 19, 25, 30, and 20, all had their first attack at a much earlier age than their mother; one of these committed suicide and two were found dead. This pedigree illustrates well the signal tendency to the occurrence of antedating. The sound members of the stock apparently inherited their temperament from the father's side, and the one member that is married has quite healthy children; this looks as if the unsound elements of this degenerate stock had been cleared out by segregation of the unsound germinal determinants, causing intensification of the disease and occurrence of the onset at an early age, thus preventing propagation.

alcoholism, dipsomania, hysteria, hypochondriasis, exophthalmic goitre, neurasthenia, psychasthenia, migraine, petit mal, or neuroses of an epileptic character, often unrecognized because not manifesting fits of the major form of the disease.

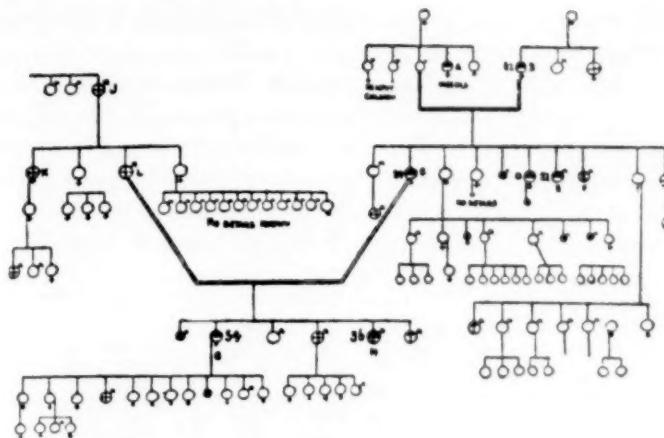


FIG. XIII.

Pedigree showing the apparent elimination of the unsound elements in a stock with dual insane inheritance. A, an imbecile, but was never put away. B, became insane at the age of 62; melancholia; in Colney Hatch Asylum for nine months but eventually died in Caterham Asylum. C, became insane at the age of 24 (St. Luke's Asylum) after the birth of her first child, which died in infancy; she was discharged after five months; her next attack occurred at the age of 38 (when suckling her last child), when she was in Hanwell for twenty months with acute mania; at the age of 43 she was admitted to Colney Hatch and died there seventeen months later. D, very peculiar and eccentric, but was never put away; she married twice, and by her first husband had one child which died in infancy from convulsions, by her second husband no children; she died between 40 and 50 years; described by her relatives as insane. E, became insane at the age of 32, acute mania, and died after three days residence in Hanwell; had been in feeble health for years and had suffered from lead colic on two occasions. F, epileptic fits from infancy; admitted to Hanwell Asylum at the age of 28; after seventeen years residence was transferred to Glamorgan County Asylum. G, became insane at the climacteric period; admitted to Cane Hill at the age of 54; chronic mania; teetotaler; her children and grandchildren, with the exception of one son, aged 26, who "drinks and bets," are not affected. H, has had delirium tremens; married an alcoholic, now in Islington Infirmary; no children; first certified at the age of 36 and has been in and out of asylums ever since; has been in Claybury Asylum five times, and other asylums besides; in features he is supposed to resemble his paternal grandfather, but in versatility and humor apparently resembles his maternal grandfather, who was a famous clown. J, K, L, are reported to be alcoholic, but in spite of this they all lived to good ages. J died at the age of 75; K is still living, over 70 years of age; and L died at the age of 74. Longevity is characteristic of this stock.

#### THE CREATION OF THE NEUROPATHIC INHERITANCE IN HEALTHY STOCKS.

If my premise is true that nature is always trying to end or mend a degenerate stock by natural selection and sexual selection aided by anticipation, or the signal tendency to the occurrence of insanity at an earlier age in the offspring of insane parents, there must be causes at work which either tend to revive a latent neuropathic inheritance or to develop the first stage of degeneracy by the cumulative effects of an unfavorable environment on pre-

viously healthy stocks. The great difficulty is to determine what are previously healthy stocks.

We have seen that the neuropathic inheritance is much wider than is generally supposed, and includes many temperamental conditions and masked forms of inborn neuroses and psychoses which might easily escape recognition without very complete and careful investigation. Consequently unsuitable mating may easily be overlooked as a cause of epilepsy or insanity appearing in a

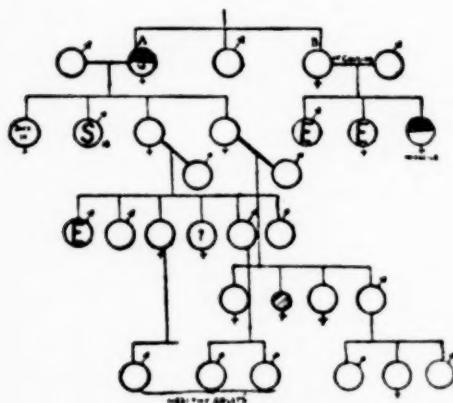


FIG. XIV.

This pedigree shows the result of marriage of first cousins, in both of whom there was a latent neuropathic taint. The family consisted of three individuals—two sisters, A and B, and an elder brother, who was married but had no family. B married a first cousin, and although neither of them was insane nor epileptic, yet they had two children epileptic and one a congenital imbecile; this terminated the stock on that side. That there was latent insanity was shown by the result of the marriage and the fact that a sister became insane. A, however, married into a healthy, virile stock; she became insane at the age of 38. Although living many years after, she never recovered; the exciting cause was the death of a son by suicide (S) at the age of 18. There were two daughters who became mothers of families; the eldest son of one suffered with masked epilepsy, but no other evidence of neuropathy was shown in this generation. The taint seems to have disappeared, inasmuch as there are healthy, grown-up members of the fourth generation.

family. This was so in the case of the pedigree of two cousins, which I will show you (Fig. XIV). Again, there may be a latent insanity in a stock, and by not searching far enough back in a pedigree *per se* may be assigned as the cause of epilepsy or insanity appearing in a family tree. This pedigree (Fig. XV) is of interest as showing how uncertain may be the results of mating even in the case of the most heritable of all forms of nervous and mental disease—epilepsy. The most unpromising mating in this

pedigree seems to have ended in a few generations in the elimination of the unsound elements. In the next pedigree (Fig. XVI), however, we find that the epileptic taint may skip a generation, so that we are never sure of the absence of a latent tendency, which may be revived by unpropitious mating or some acquired conditions involving the general health of the body and especially the

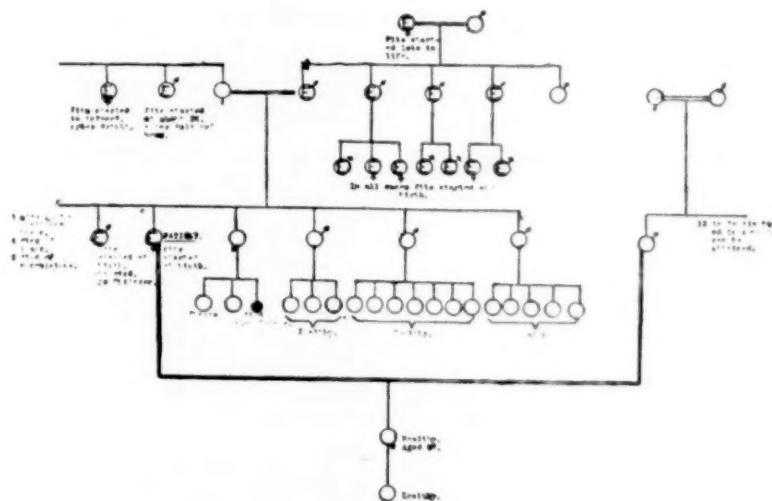


FIG. XV.

The above pedigree shows the transmission and apparent elimination of a marked epileptic taint.

The pedigree commences with the grandmother of the patient whose fits commenced late in life. Four of her children were epileptics, and one, now dead, was not. According to the history three of these married and begat between them seven children, all epileptic, whose fits commenced at birth.

The eldest, however, married a female who was not an epileptic but came from an epileptic stock, shown by the fact that she had a brother and a sister subject to fits. There were numerous children from this marriage, and of the six surviving, two were epileptics from birth (one of whom is the patient), and the remainder are healthy; also their children with the exception of one suffering from chorea.

The epileptic patient married into an apparently good stock, one healthy female child was the result; and this child has reached adult age and is now the mother of a healthy infant.

brain. The next pedigree (Fig. XVII), is of interest in showing healthy and intelligent progeny from a family in which all the surviving members are or have been insane. But we cannot predict yet what may happen to these children, as only few of them have arrived at adult age. The puerperium seems to have been in the case of all the four females the exciting cause of the insanity.

One of the questions of greatest interest in the study of heredity in relation to insanity is this, can the germ plasm, long subjected to poisoned conditions of the blood, undergo a pathological mutation affecting the functions of that most complex of all organs—the brain—the only organ which could vary with advantage to the individual and the species, and therefore which is possibly not fixed and stable as regards its highest and latest developed functions? Poisons may be introduced into the body from without for

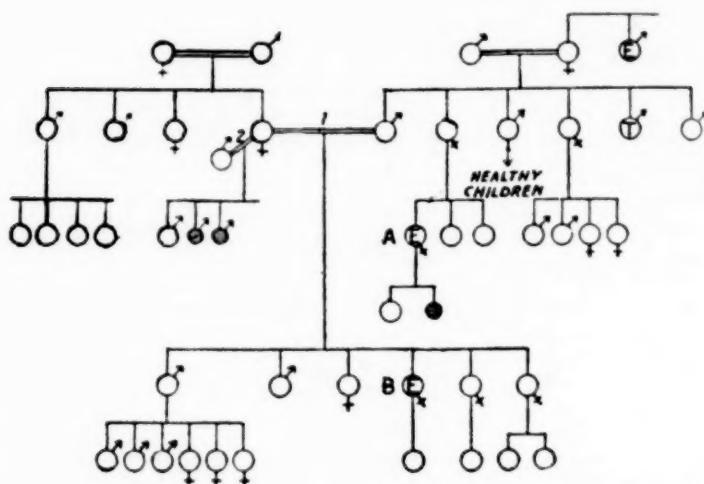


FIG. XVI.

This pedigree is of interest in showing the appearance of epilepsy in two members of a stock after it had missed a generation. All other members of the stock were mentally unaffected. One of the offspring of one of the affected members (A) died from injuries received while the mother was in a fit; while the only child of the other affected member (B) was the result of a seduction by her stepfather.

long periods of time, as in the case of chronic alcoholism and lead poisoning. Poisons may be engendered in the body as the result of the invasion and growth of parasitic organisms, *e. g.*, syphilis and tuberculosis. Can these race poisons cause a loss of specific energy of the germ cells so that they are affected as regards the determiners of the higher and later developed functions of the brain? It is extremely difficult to show by pedigrees that a blood poisoning can produce *per se* a mutation of the germ plasm, causing epilepsy and insanity to arise in a healthy stock and be transmitted. It is first necessary to prove by careful in-

vestigation that there is no latent epilepsy or insanity in the two families; secondly, that it is not due to the commingling of two germ plasms, in one or both of which there is the undiscovered latent seeds of the neuropathic taint.

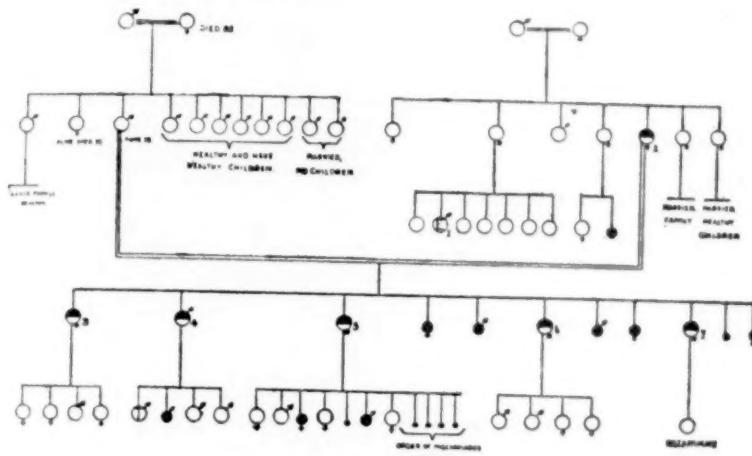


FIG. XVII.

The above pedigree is of interest in showing healthy and intelligent progeny from a family in which all the surviving members are or have been insane. The father of this family is living (aged 72) and his brothers and sisters are normal and show longevity and fecundity, their children being healthy. On the mother's side there is no insanity noted, except in the case of (I) who commenced to have fits at the age of 4, these were severe and continued until she was 12.

— the mother, who commenced to have fits at the age of 4, these were severe and continued until he died at the age of 38. — the mother, she first became insane at the age of 38, at the time of the birth of (7). From this time until she was aged 54 she was in and out of asylums, but from 54 until the age of 66 she remained outside when she was again admitted to the asylum and remained there until she died at the age of 79.

3—is now in asylum. First certified at the age of 45, but she had had three attacks previously and these were associated with the birth of her children. Her four children, however (eldest 19, youngest 10), are healthy and above the average intelligence.

4—is now in asylum. Admitted to the asylum at the age of 45, had previous attacks but was not certified. Cause stated to be worry due to desertion by his wife. His first child died, aged 17, of consumption, the second died, aged 3, from complications arising from rickets. The two other children are alive and healthy, aged 18 and 14 years respectively.

5—one attack of insanity at the age of 30, in asylum for three months following the birth of her 5th child. The surviving children are healthy, clever, and above the normal order of intelligence.

the normal order of intelligence.

7—first attack at age 10, associated with birth of an illegitimate child. Had three attacks since and is now in asylum.

I have been able to obtain two pedigrees which, I think, will fulfil as nearly as possible these conditions. The first pedigree relates to a woman with two families (Fig. XVIII) : by her first

One of the questions of greatest interest in the study of heredity in relation to insanity is this, can the germ plasm, long subjected to poisoned conditions of the blood, undergo a pathological mutation affecting the functions of that most complex of all organs—the brain—the only organ which could vary with advantage to the individual and the species, and therefore which is possibly not fixed and stable as regards its highest and latest developed functions? Poisons may be introduced into the body from without for

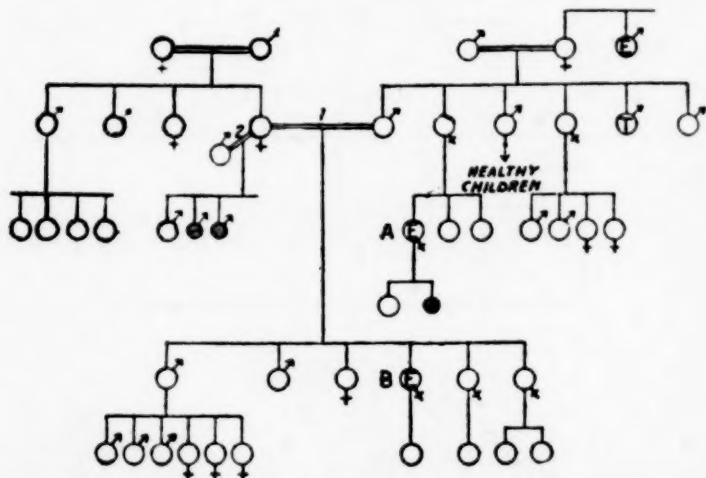


FIG. XVI.

This pedigree is of interest in showing the appearance of epilepsy in two members of a stock after it had missed a generation. All other members of the stock were mentally unaffected. One of the offspring of one of the affected members (A) died from injuries received while the mother was in a fit; while the only child of the other affected member (B) was the result of a seduction by her stepfather.

long periods of time, as in the case of chronic alcoholism and lead poisoning. Poisons may be engendered in the body as the result of the invasion and growth of parasitic organisms, *e. g.*, syphilis and tuberculosis. Can these race poisons cause a loss of specific energy of the germ cells so that they are affected as regards the determiners of the higher and later developed functions of the brain? It is extremely difficult to show by pedigrees that a blood poisoning can produce *per se* a mutation of the germ plasm, causing epilepsy and insanity to arise in a healthy stock and be transmitted. It is first necessary to prove by careful in-

vestigation that there is no latent epilepsy or insanity in the two families; secondly, that it is not due to the commingling of two germ plasms, in one or both of which there is the undiscovered latent seeds of the neuropathic taint.

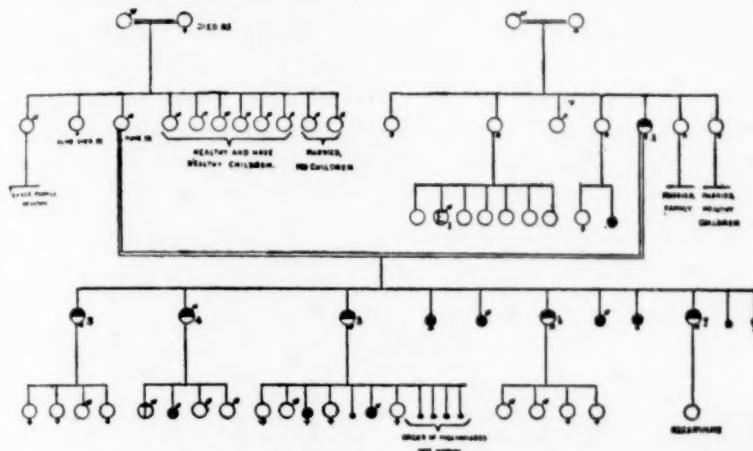


FIG. XVII.

The above pedigree is of interest in showing healthy and intelligent progeny from a family in which all the surviving members are or have been insane. The father of this family is living (aged 72) and his brothers and sisters are normal, and show longevity and fecundity, their children being healthy. On the mother's side there is no insanity noted, except in the case of (1) who commenced to have fits at the age of 4, these were severe and continued until he died at the age of 38.

2—the mother; she first became insane at the age of 38, at the time of the birth of (7). From this time until she was aged 54 she was in and out of asylums, but from 54 until the age of 66 she remained outside when she was again admitted to the asylum and remained there until she died at the age of 72.

3—is now in asylum. First certified at the age of 45, but she had had three attacks previously and these were associated with the birth of her children. Her four children, however (eldest 19, youngest 10), are healthy and above the average intelligence.

4—is now in asylum. Admitted to the asylum at the age of 45, had previous attacks but was not certified. Cause stated to be worry due to desertion by his wife. His first child died, aged 17, of consumption, the second died, aged 8, from complications arising from rickets. The two other children are alive and healthy, aged 18 and 14 years respectively.

5—one attack of insanity at the age of 30, in asylum for three months following the birth of her 5th child. The surviving children are healthy, clever, and above the normal order of intelligence.

6—first attack at the age of 24 following the birth of first child, two other attacks since associated with childbirth. Her eldest child, aged 11, had convulsions from 14 months to 3½ years of age, but is now healthy and clever. The remaining three children are bright and healthy.

7—first attack at age 19, associated with birth of an illegitimate child. Had three attacks since and is now in asylum.

I have been able to obtain two pedigrees which, I think, will fulfil as nearly as possible these conditions. The first pedigree relates to a woman with two families (Fig. XVIII); by her first

husband, with no history of the neuropathic taint in his family, she has healthy children and grandchildren, many of whom are grown up. She then married a man who was a drunkard, one of a family of drunkards; his father was a drunkard; one of his brothers, a drunkard, had ten children, and of these one was deaf and dumb and another an imbecile; otherwise there was nothing in the family indicating an hereditary taint. The offspring of this woman by the second husband were as follows: a boy with pseudo-muscular dystrophy; a normal boy; and a feeble-minded, epileptic imbecile. A glance at the pedigree seems undoubtedly to show

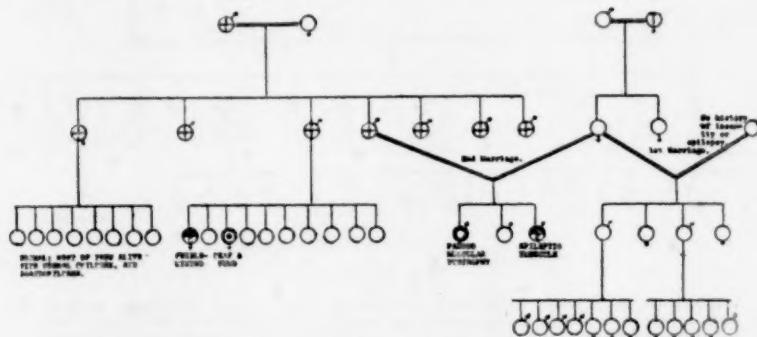


FIG. XVIII.

that the father's germ plasm was accountable for these defects and drink in successive generations the probable cause.

The next pedigree (Fig. XIX) obtained for me by Mr. Leeming is even more suggestive of alcohol and syphilis as a cause of epilepsy and insanity. Two brothers coming from a sound stock traced back two generations previously married two sisters. One sister died of alcoholic cirrhosis of the liver and paraplegia. The other married twice. By her first husband she had children free from epilepsy and insanity, and by her second husband a child who had grandchildren, none of whom were affected. Her sister, who died of cirrhosis of liver and was a drunkard, was married to a man who very possibly had suffered with syphilis, as he died from the rupture of a large blood-vessel (aneurism); there were nine living children; three were insane and one epileptic. The pedi-

gree shows what happened to these, and this hereditary taint was transmitted to the next generation. The next pedigree (Fig. XX)

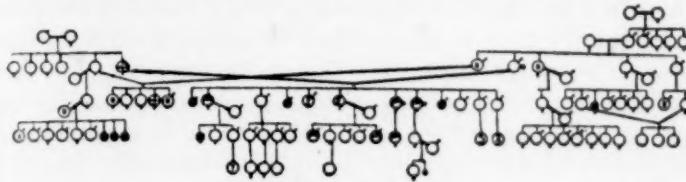


FIG. XIX.

This pedigree is of interest in showing the marriage of two brothers with two sisters. In the first instance the male suffered with heart affection, which was transmitted to the offspring. In the second case the female suffered from cirrhosis of the liver and paraplegia, and was probably alcoholic and possibly syphilitic. The result was three insane and one epileptic offspring. From the first insane daughter the issue was apparently unaffected; but from the next daughter who had masked epilepsy, of five children born two were insane. The next two insane daughters each gave birth to an illegitimate child by the same father; one of these children became insane at adolescence, whereas the other has married and has an apparently healthy child. H denotes heart affection. Half-black circles, insanity.

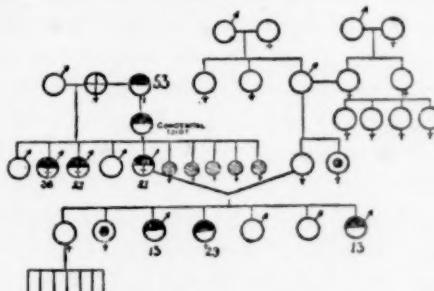


FIG. XX.

A family of drunken and insane people. The figure with half-black circles are insane; the same with a cross indicate drink and insanity; the circles with only a cross indicate excessive drinking. The two stocks show a marked difference; one side, the maternal, is practically free from any taint; almost every member of the paternal stock is unsound. The degeneracy commenced with a drunken woman whose sister died, aged 53, in Colney Hatch Asylum, where she had been twenty years; she had a congenital imbecile daughter in Leavesden. The result of mating a sound individual with a drunken woman with insane predisposition is shown in the members of the family born: a son, healthy, then two alcoholic sons who were insane at the ages of 36 and 27, then a healthy son, then another alcoholic son, who also was insane at the age of 27; finally, five daughters who died in early life, probably through the neglect of a drunken mother, indicated by small, shaded, circular figures. One member of this drunken and insane family married into a healthy, sound stock. Seven children were the fruit of this marriage; of these, two sons and a daughter were normal, and three were insane, two of them having become insane at the age of 13. The clear circle with a black center indicates bodily disease. I used to give this pedigree as an instance of drink causing insanity, but after the establishment of the card system of relatives I found the notes of the sister of the drunken grandmother; she was an inmate of Colney Hatch for twenty years. It sometimes happens that the one is taken and the other left, and it would have been a benefit to society if the drunken progenitor of this degenerate stock had been taken.

shows how very difficult this question is, for the case has been cited in many temperance books as an instance of a drunken parentage

causing insanity, but the card system, however, revealed insanity as well as alcoholism on the paternal side.

It may be a biological heresy, but it is firmly rooted in the minds of the majority of practising physicians, that a chronic blood-poisoning (especially when occurring in successive generations) produced by the racial poisons, alcohol, syphilis and tuberculosis, can *per se* cause degeneracy in a healthy stock by a pathological mutation of the germ plasm, which can be transmitted. Biologists say that you are assuming that an acquired character can be transmitted and you must prove that the poison is not acting on the individual by reviving a latent neuropathic taint. In a great number of cases this is probably true, but a collection of pedigrees such as these two, in a sufficient number, would afford, I believe, the proof required even by biologists.

## ON THE AETIOLOGY OF PELLAGRA AND ITS RELATION TO PSYCHIATRY.\*

By PROFESSOR O. ROSSI.

*Motto:* I am only like a child picking up pebbles on the shore of the great ocean of truth.—NEWTON.

The problem of the aetiology of pellagra has been studied by numerous investigators for a very long time. Notwithstanding all the labor expended on it in my opinion the problem is still to be considered as unsolved. This judgment may surprise some and perhaps will be taken up sceptically on many sides. We must indeed accept the fact that up to the present day an apparently perfect and satisfying doctrine maintained its existence among experts, and still is supreme with the laity; this has the so-called Lombroso theory. If, however, we consider the experiments which form the foundation of this theory it becomes unintelligible how it could have persisted so long, almost without contradiction. The conditions at the time of its rise do, however, explain this fact. In those days investigators tired and, almost in despair over the long protracted efforts to solve many a clinical question, pinned all their hope on the light of laboratory experiments; on the other hand, the authorities and the people directed their attention to pellagra which, notwithstanding all the efforts, spread more and more. During this tension of expectation Lombroso brought forth his experiments which corroborated and perfected an already well-known clinical hypothesis. The desired solution seemed to have been found. As always happens during a period of enthusiasm the facts which did not agree with that theory were relegated to the scrap pile with excessive zeal, and the few isolated voices which arose against it were silenced or were decried as heretical. As soon as the intoxication over the supposed discovery had passed by the neglected facts gradually came into their rights again; but they could not get at once their full strength because the Lombroso theory indirectly had a favorable practical effect which supported

\* Address delivered at the opening exercises of the Henry Phipps Psychiatric Clinic, The Johns Hopkins Hospital, Baltimore, Md., April 16-18, 1913.

its scientific arguments. A problem only apparently solved will, however, sooner or later inevitably come again to widespread discussion. This is what happened with the problem of the aetiology of pellagra; and from the new discussions new theories arose. They rarely take up absolutely new paths, usually they connect new facts with old ones in such a way that it is impossible to pass over the latter in order to give a clear consideration to the former.

The theory which referred pellagra to misery and poor nutrition in general soon was declined, as it was not hard to see that there was no constant relation between these hypothetical causes and the appearance of the disease (1). The other doctrines can mainly be divided into two large groups: that of the corn theories and that of the infective theories.

#### CORN THEORY.

(a) The theory established by Marzari (1804), and especially elaborated by Lussana, according to which corn as an insufficient food causes pellagra, could not be maintained. Corn has not such a low nutritive value as was formerly believed. Moreover pellagra affects also persons who use besides corn other foods in sufficient quantity. With regard to the nutritive value of corn, however, it is necessary to draw attention to the experiments of Devoto's school, which proved that many animals, for instance guinea pigs, when fed exclusively on corn show morbid changes (a claim substantiated by Luksch, Ballner, Paladino and Audenino), and to the fact that Lo Monaco was able to extract from normal corn a substance, the Zein, which has a damaging effect on animals (2). Finally it is well to remember that Devoto found that recovered pellagrous patients relapsed when fed with normal corn.

(b) A second corn theory is represented by De Gaxa. According to the latter, corn offers to various bacteria, especially to the colon bacillus, a favorite culture medium to form in the intestinal tract toxins which would cause the pellagra when getting into the circulation. This assumption is supported by the experiments of Pulvirenti Amore, Paladino and Blandini, who found that the virulence of the colon bacillus rises when the microorganisms are cultivated on a nutritive medium containing corn.

(c) Associated with the corn theory is also the so-called photodynamic one. Even the first pellagrologists, Frappolli, Strambio, and Stoffella, observed the damaging influence of the sun on the skin of the pellagrous, and on their general condition (3). Of late Aschoff expressed the view based on the doctrine of photosensitization of Tappeiner that the cause of pellagra was to be found in a substance derived from corn which sensitizes the skin to sunlight, a view corroborated by Orbaczewski and Lode on ground of animal experiments.

Raubitschek fed white mice with corn, and observed that only those exposed to the daylight died. On ground of these experiments he generalizes Aschoff's views to cover the whole disease. Rondoni, however, established the fact that corn is an unsatisfactory food for mice; moreover, that when exposed to sunlight they died independent of corn or any other food. Moreover, Umnus found that even the white corn, which was supposed not to possess any photosensitizing substances, exerts a toxic effect on mice; and on the other hand, Sormani found that the lipochrome of corn has no poisonous effect on experimental animals. Hausmann and Ghedini transform Raubitschek's theory and complete it. The latter is of the opinion that corn food having a damaging effect on the erythrocytes caused the appearance of haemato porphyrin, which serves as a photosensibilizer, or photosensitizer. To this assumption there is the objection that the appearance of haemato porphyrin in pellagrous patients is not demonstrated and that people in whom it is present do not develop pellagra, even if they are exposed to sunlight. Moreover, the clinical observation that the pellagrous manifestations appear so often before the spring does not agree with the photodynamic theories.

(d) A further group represents that corn theory, according to which only spoiled corn becomes pellagrogenous. The most widely spread and most tenaciously maintained theory of this group starts from the view that a toxic substance is formed in the spoiled corn by the effect of parasites, and that this substance causes pellagra when it gets into the organism. This theory, although known by Lombroso's name, was already formulated by Vincenzo Sette in the year 1818, and later further developed by Balardini in 1844 (4). Lombroso devoted to it a long series of studies and experiments with the double aim to get a broader view

of the relations between pellagra and spoiled corn, and to identify the toxic substance of the latter. As to the first point, Lombroso based the doctrine on the result of the epidemiological investigations, and upon the observation of the changes produced in animals fed with spoiled corn. The epidemiological results fall under the same objections which we shall direct later against all corn theories; and the experimental findings cannot be credited with the value that Lombroso ascribes to them. In reality he fed, as has already been done by Balardini, chickens with spoiled corn, and he observed many phenomena which were later denoted as "pellagra dei polli" (emaciation, diarrhoea, loss of the feathers). To tell the truth it takes a great deal of good will to identify them with the pellagra of man; or even to accept them as mere equivalents of the same, as is done by the *toxico-zeist*: the results obtained with the same method in other animals are by no means more convincing.

In order to extract the pellagrogenous poison Lombroso used boiled corn and obtained (1) a red oil, (2) a glue-like substance, (3) the pellagrozein. It is to the latter that he ascribes the most intense pellagrogenous effect. Lombroso studied this effect in men and in animals. The experimental animals were given the alcoholic extract containing pellagrozein from spoiled corn with their food, or injected. This had pathological results which, however, could only be evidence of a toxic effect, but by no means prove that it was pellagrogenous. Nor would it be possible to refer the toxic effect to any definite substance because Lombroso used in his experiments as a rule considerable quantities of alcoholic extract of artificially spoiled corn in which the spoiling had been carried almost to the point of putrefaction (5). Indeed none of the investigators, Pellogio, Brugnatelli, Zenoni, Berthelot, Selmi, Dupré and Babes, who aimed at determining the pellagrozein chemically, succeeded with their attempts. Several persons were given these alcoholic extracts to drink; the result was as a rule a vague subjective and a few equivocal objective symptoms (a decrease as a rule, rarely an increase of the body weight, diarrhoea, and desquamation). In 1873 a commission appointed by the Institute Lombardo repeated Lombroso's experiments, but arrived at negative results. Five physicians subjected themselves to feeding with spoiled corn and drank the tincture derived from it without any damaging effects.

After Lombroso, Neusser deserves to be mentioned. He believes that spoiled corn does not contain any really pellagrogenous poison, but only the foundation or mother substances for the same, which, however, are changed into poison as soon as they reach an already diseased intestinal tract (Audenino lately expressed a similar opinion). In order to complete the presentation of the corn theories, I have to mention also Perni, who believes that *Oidium maidis* works in corn like a diastase, by which the albumen is transformed into toxin; and further that, according to the view of Romano, pellagra is connected with the germination of healthy corn (Enzimism).

There remains to be mentioned that, especially in favor of Lombroso's theory, experimental tests were made in the direction of the immunity doctrine. Babes and Manicatide found that the blood serum of recovered pellagra patients was able to reduce the toxic effects of extracts from spoiled corn. These experiments might prove that in the serum of persons who have eaten spoiled corn an anti-toxin is formed against the corn poison, but that doesn't prove that the corn is the cause of pellagra (5). There is really no better evidence furnished by the observations of Antonini and Mariani, according to which the serum of cured pellagrous patients from regions where corn is used has an antitoxic effect against the blood serum of an animal immunized with spoiled corn. More recent evidence established by Volpino and others, who observed in pellagrous patients anaphylactic states after the injection of watery extract from spoiled corn, also fail to decide the question, especially because the reaction was by no means a specific one.

I have so far touched upon the weak points of the individual corn theories, and I now turn to the objections which can be raised against any corn theory. The first and most important one is that pellagra also affects persons who never ate corn or corn products. Already G. Strambio describes such cases, and in recent times similar observations have been repeated. It is true that the most obstinate Zeists are sceptical as to this possibility, and they are very apt to speak of mistakes of diagnosis. This explanation is, however, simple, too simple to serve as evidence against the numerous observations of trained investigators (7).

A second objection is that pellagra is absent in certain regions where corn is used. In many cases the absence of pellagra may, of course, only be a supposition, because it may be overlooked on account of lack of acquaintance with it. Yet Pieraccini found no pellagra, and A. Marie only a few cases, in Brazil, where corn, even spoiled corn, is used. In Italy the Island of Sardinia, with sufficient use of corn, is free from pellagra (8). I put little stress on the third objection, *i. e.*, that pellagra occurred too late after the introduction of corn. It is not always possible to state definitely when corn was introduced and when pellagra appeared first historically (9). Moreover, one should not only know when the cultivation of corn was introduced, but also when corn began to be a widely-spread food for the people. With regard to Lombroso's theory, one should also study how corn was cultivated in many countries, and what modifications the culture of corn was subjected to. To give but one instance: Alsburg found in the southern states of the United States that corn had only lately been harvested somewhat unripe, owing to the introduction of the rotation of crops and owing to the cessation of topping (10).

From the corn theory we turn to Gosio's theory. Gosio assumes that *Penicillium glaucum* and *Aspergillus glaucus, novus, flavescens* and *varians* develop a substance very toxic to animals, and presenting many phenol reactions when grown on media containing carbo-hydrates (11). This doctrine is related to the corn theory in as far as the fungi grow very often on corn, but it assumes a special position, because it admits that the fungi can also form on other food materials a toxic substance which might explain the existence of pellagra without corn. To be sure Gosio always adduced his experiments as an instance of the effect of spoiled foods, and he leaves open the question whether these poisons are the only specific cause of pellagra. The doctrine that pellagra is caused by the use of vegetable oils is mentioned only as a curiosity (12).

#### INFECTION THEORY.

These may properly be divided into three groups, according to the kind of the supposed pellagra producer, *i. e.*, the groups of the schizomycetes, hyphomycetes, and protozoa theories.

*Schizomycetes*.—In 1881 Majocchi found in the blood of pellagra cases at the beginning of their illness a microorganism

which he also found in the water of regions where corn is raised, and within the grains of corn. He called it *bacterium maidis*, and declared it the cause of pellagra. On the one hand, the existence of the microorganism in the blood was not corroborated by many investigators: (Cuboni, Lombroso, Neusser and V. Marchi). On the other hand, bacteriological investigations, especially those of Paltauf, identified the *bacterium maidis* with one of the ordinary potato bacilli (*B. mesentericus vulgaris*). It thus loses the principal rôle as the cause of pellagra, and receives a subordinate position as the cause of spoiling of corn. In 1906 Tizzoni published a similar doctrine. From the blood, cerebro-spinal fluid, internal organs of pellagrous cases in the acute forms, and from the faeces of chronic pellagrous cases, he isolated a microorganism—*Streptobacillus pellagrae*—which he makes responsible for the disease (13). Tizzoni found this bacillus also on the corn, and he claims that it got there through the fertilizing of the seeds with faeces of pellagra cases. The microorganism has a pathogenic effect on many animals, but here, as in the Lombroso theory, we must remark that the morbid changes produced in animals not only do not compare with pellagra, but enter the category of phenomena produced by many kinds of infections or intoxications (14). This theory calls for many objections. In the first place, it cannot exclude conclusively the possibility that the bacteria found in the blood are merely ordinary intestinal organisms which may enter the circulation. Such a possibility would have to be absolutely excluded all the more, as Tizzoni found the bacilli only in the blood of very severe pellagra forms, and since he often isolated them from the dead (15). Positive results of their control experiments from the blood were obtained by Ramella, Terni, Wolf James and Wood. On the other hand, they were negative in the hands of Raubitschek, Rossi, Lavinder, Bravetta, Cesabianchi, Bezzola, Perroncito. The latter did not even find the Tizzoni bacillus on the corn (16).

The theory of Tizzoni has lately received considerable modification. In a preliminary communication he announces that the chains of bacilli, cocci, described by him formerly, are nothing but the parts of ramified threads, whose protoplasm has decayed into bacillus or coccus-shaped pieces. Frequently these organisms end in cones, and are arranged in tufts, which start from a granular

center. On the ground of these observations Tizzoni expresses the opinion that his microorganism is not polymorph, but pleomorph, and does not belong to the schizomycetes, but to the actinomycetes (according to Lachner Sandoval), and perhaps also to the higher hyphomycetes.

*Hyphomycetes*.—In the year 1902 Di-Pietro (17) reported that the spores of *Penicillium glaucum* contain toxin which, when injected into chickens or given in the food, produce morbid phenomena. The most outspoken advocate of the hyphomycete theory is Ceni. On the ground of numerous experiments he came to the conclusion that the hyphomycetes are the cause of pellagra. He incriminates *aspergillus* and *penicillium*; among the former *fumigatus*, *flavescens*, *varians*, *niger*, *ochraceus*, and a variety which he calls *aspergillo bruno gigante*. Of the latter he assumes two varieties, the *penicillium glaucum A* and *penicillium glaucum B*. The theory rests on the following facts: Many of these hyphomycetes are frequently found in the faeces of pellagra cases, on spoiled corn, spoiled corn-meal or polenta, and moreover it is possible to raise some of them, for instance, the species *varians* and *ochraceus*, from the air of dwellings in regions with pellagra. Pieces of the internal organs of pellagrous patients cultivated in Raulins fluid often yield fungi of the genus *aspergillus*. The hyphomycetes have a toxic action on animals into which they are introduced on corn-caryopses into the abdominal cavity. Guinea-pigs fed with infected corn die; chickens emaciate, lose the feathers and suffer with diarrhoea.

The pellagrogenous effect of fungi neither belongs to the substratum on which they grow nor to the mycelium, but rather to the spores. When they are introduced per os into the organism the gastric juices act so that they lose their germinating properties, whereas their toxic power remains unaltered. The spores of the *aspergilli*, especially of *aspergillus fumigatus*, spread within the organism and reach the internal organs, eliciting very grave forms of pellagra. Those of the *penicillia* remain in the intestinal tract and exert from there their toxic effects.

The various hyphomycetes form poisons of different natures, either stimulating and producing convulsions or depressing and paralyzing; one and the same fungus can, however, furnish different poisons in different seasons (18). Ceni, moreover, observed

that the hyphomycetes are more poisonous in those seasons in which pellagra reigns more violently, and in the regions where it is spread they exert a pellagrogenous influence, whereas they ceased in the regions in which the disease does not occur. These circumstances corroborate the view that the fungi mentioned are sources of pellagra. Many important details of this theory were disputed (19); but apart from that it is not convincing, above all things because Ceni has never demonstrated the pellagrogenous spores in the tissues of pellagra cases. It is true he cultivated from the internal organs of pellagra cases hyphomycetes, but according to one of the most important corollaries of his theory they cannot be derived from pellagrogenous spores. Indeed, he says that the spores do no longer produce the well-known hyphomycetes disease (pseudo-tuberculosis) but pellagra when through the action of the gastric juice their germinating qualities have been lost. The animal experiments are subject to the same criticisms which have been mentioned before for the Lombroso theory.

G. W. Rehrer also thinks that the *aspergillus fumigatus* and *flavescens* have something to do with pellagra. He found genuine granulomata in the internal organs, however (20).

The theories mentioned so far are not wholly separate from corn, inasmuch as they admit that the corn is the most widely spread carrier of the infective agents, and that it may increase its toxic effects. Under the motto "free from corn" we meet the opposite, *i. e.*, the protozoal theories. Sambon believes that pellagra is to be attributed to a protozoan which is transferred to man by the bite of a Simulium. As a matter of fact this theory is a pure hypothesis, for neither in pellagra cases nor in simulia has the supposed agent been found. That pellagra follows in its distribution, that of the simulia as Sambon maintains, has been denied on many sides (21).

According to Young, pellagra is brought about by amoebæ, but his assumption has found few adherents. Many investigators, however, admit that the amoebæ furnish only a predisposition of the intestinal tract for the absorption of the poison.

Our hasty review of the field of theories will come to the conclusion with a brief sketch of the Alessandrini theory. Even Dalla Bona thought he had found the cause of pellagra in the use of poor water. Alessandrini observed in poor water larvæ of the

genus *Filaridae*. It was sufficient that two larvæ, a male and a female one, should get through water into the organism in order to cause an infection which would lead to pellagra. But these organisms have never been found in pellagra patients, and, moreover, the epidemiological relations between pellagra and impure water are by no means established (Frattini, Bezzola, Camurri, Commissione pellagrologica ministeriale italiana) (22).

If I may now express to you my personal opinion of the problem of the aetiology of pellagra, I am forced to admit that our knowledge does not reach very far beyond that of the first pellagrologist. If we admit that pellagra is a genuine autonomous disease, which I think is difficult to deny, we still have to look for its specific cause. We only know collateral causes, the importance of which is, however, very difficult to measure, as is always the case where the real causes are hidden from us. As collateral causes I may mention poor economic and hygienic conditions. Notwithstanding the rare cases in the well-to-do, observed especially in America, pellagra remains a disease of the poorer class. The exceptions merely prove that pellagra is not produced by misery alone, and they allow us to suspect a cause which may alone or under favorable conditions be effective. Poverty, poor food, and an almost exclusive diet of corn are practically synonymous with the country population of many regions. Healthy corn, apart from observations on its chemical constitution which tried wholly theoretically to make it appear as a not insufficient food, must be viewed as insufficient from a practical point of view (23); this holds even more for spoiled corn or spoiled products of corn, which, unfortunately, are used when poverty passes into misery or destitution; moreover one cannot exclude the possibility that spoiled corn may have a toxic though not specific effect. My view of the importance of the collateral causes mentioned finds support in statistical data. Pellagra disappeared from the province Les Landes soon after the soil had been made fertile, owing to the efforts of Napoleon, and gave thereby a richer yield and raised the general prosperity of the people. In Italy pellagra is on the decrease. Cantarutti counted in the year 1881 in an agricultural population from a pellagra region 104,067 pellagra cases among 6,414,414. In the year 1910 the same population had risen to 7,886,497, and the number of pellagra cases had come down to

33,869. These statistics can be depended on, because they were worked up with the same criteria (24).

The fight against pellagra in Italy goes in two directions; the direct activity of the government decreases the consumption of spoiled corn by supervision of its sale. Special commissions nominated in the various provinces aim at providing better food for the pellagra cases. The effect of these provisions indirectly works in the same direction. The farmer draws the conclusion from the law that the sale of spoiled corn is prohibited, because such corn causes pellagra. Further, he gets the experience that better food acts favorably on the disease. Therefore he demands better wages from the landlord in order to avoid the disease and to procure proper food. The landlord who has to pay the laborers more is forced to improve the agriculture, the economic conditions are thereby improved and the pellagra decreases.

The question of pellagra may be considered from two points of view, the social and the scientific. From the social point of view all authorities have to maintain severely the present rules against the dealers, for the latter already begins to exploit the uncertainty of the scientific knowledge of the aetiology of the disease. From a scientific point of view a renewed careful revision of the statistics and the epidemiological conditions of the disease is desirable. A possibly specific cause of the disease should, according to my own modest opinion, be looked for with special zeal in the organism of the pellagra patients, *i. e.*, the undoubted determination of the organisms must precede the study of the avenues of entrance and the effects of the agent.

Many of the theories mentioned followed another course, arrived at no solid results and repeated themselves at various times with various modifications. Lussana improves Marzari, Lombroso follows the traces of Balardini, who comes close to Sette; Pari gives the impulse to the theory of hyphomycetes; Tizzoni resuscitates Majocchi; Manning gives a new garb to Hameau; Dalla Bona can be seen behind Alessandrini, but the specific cause of the disease remains hidden. In these efforts one must not disregard the fact that the pathological anatomy of pellagra in general and especially the changes in the central nervous system have more the stamp of an intoxication than of an infectious process.

## II. *Relations of Pellagra to Psychiatry.*

Alienists differ in their treatise of pellagra. Some of them point to it only as one of the general causes of insanity; others devote to it a special chapter, but believe that the psychic manifestations belongs to other well-known psychoses which can also have another cause, *i. e.*, amentia and melancholia. Very few only express the view that the mental symptoms have their own traits (25).

The first two classes practically arrive at the same conclusion that pellagra from a psychiatric point of view is only a cause of already known mental diseases, but methodologically the second class takes a more advantageous point of view. However, the aim of alienists must not limit itself merely to the study of mental phenomena, but it must extend also to the determination of the causes, the mechanism of their development, the analysis of the changes caused; in short, it must aim at creating complete disease pictures. It would then mean working in the opposite direction if we try to separate the mental symptoms of pellagra from the disease complex; the problem of pellagra would remain almost foreign to alienists, whereas they should take the same position with regard to it that they have taken, for instance, in the case of alcoholism. Whether pellagra leads only to well-known psychoses, or whether it produces a psychosis characteristic of it, that is a question for which to-day we still lack sufficiently convincing studies. The question, nevertheless, appears to me as a very meritorious one for alienists working in pellagra regions. The task is certainly by no means simple, and should be carried through with all precautions. Above all things, alienists should make sure that the patient who shows the mental alteration is really a pellagra case. One certainly must admit that the diagnosis of pellagra is not always an easy one. Neither the general symptoms nor the alterations of the skin show in every case a decisive peculiarity (26). The efforts of various investigators to find constant and specific biological diagnostic tests are still far from having reached the desirable aim (27). It is certainly wise to reject the opinion mentioned on some sides that pellagra psychoses can be diagnosed even without the physical symptoms of the disease. This is certainly very doubtful and should be rejected in the present state of our knowledge as dangerous. When the alienist has made the

diagnosis of pellagra there remains for him a probably even more difficult duty; he should exclude the possibility that the mental symptoms are merely those of a psychosis which happens to have broken out in a pellagra case; for indeed pellagra may easily promote, rather than retard, the action of other causes. For example, it has long been recognized that it is frequently accompanied by alcoholism which may present similar symptoms. Anyone will understand that the exclusion of the above possibilities requires the most careful observation, even where we are dealing with psychoses the symptoms of which deviate considerably from those of pellagra. In many cases, for instance, between two states of depression in a pellagra case, the one of purely pellagrous origin, the other belonging to the manic-depressive group, the direct observation may not make possible a differential diagnosis, and only the anamnestic data and the course may finally make possible a distinction. In the present state of psychiatry one must admit that investigations of the pellagra psychoses which satisfy these precautions are still to be looked for.

According to my own personal impression, the mental disorders of the pellagra cases fall into two classes, which may perhaps represent only variations of the same psychosis; in the one depression is predominant, in the other confusion. But the former is not to be identified with melancholia or the latter with amentia. A point of difference might be found in the severity or in the quality of the individual mental components of the symptom complex. We must, however, remember that the conception and the limits of melancholia and of amentia unfortunately are by no means definite, so that differential marks of this kind, estimated differently by different schools, would probably precipitate merely an elegant but useless academic discussion. Nevertheless, the pictures of pellagra and of the above mentioned disorders are distinctly different from each other as far as their origin, their course, their outcome, and, to a certain extent, their pathological anatomy are concerned. Let us enumerate briefly the differential points for the two pictures.

*The Depressive Type.*—Whereas melancholia usually comes on relatively rapidly, often after an emotional upset, and not infrequently in individuals who have had similar dysthymic reactions before, the depression in the pellagra case comes on slowly,

through a period of indefinite symptoms, which in a rather inappropriate manner have been described as neurasthenic, and as has already been seen by the acute vision of Strambio, without emotional excitement. The mood in the depressive phase of pellagra is always a sad one, and the expressions of the patient are in harmony with it. Only rarely do they seem somewhat bright and elated, especially when speaking ; yet this exception only forms a very good example of the so-called Galgenhumor (Vedrani). Phases with the clinical features of those episodes which Kraepelin has called *Mischzustände* of his manic-depressive insanity never have come under my observation. The course of thought and action is considerably inhibited in the depressed pellagra patient. This inhibition makes the patient difficult of access and interferes with their psycho-motor processes in such a manner that they are erroneously looked upon as confused or demented. This error no doubt has occurred very frequently, all the more easily as the patients very often appear devoid of will and courage rather than low spirited. Anxiety feelings come on often accompanied by motor unrest. Delusional ideas may occur, but the delusions are loose and are readily abandoned by the patient. The depressed pellagra case has always a clear realization of his physical illness. As a rule he sees the cause of his depression in the physical disorder, whereas on the contrary the case of melancholia frequently does not trace his sad mood to a disease, but to external or internal experiences, their fate and failures. With regard to physical phenomena, we must remark that the insomnia is more marked in melancholia than in pellagra depression. In the latter diarrhoea is as frequent as constipation is in the former. With regard to the course, the most important difference consists in the fact that the depression in a pellagra case may pass into confusion, but not into the manic condition, as is frequently the case with melancholia.

The picture of confusion reaches its most complete form in that condition which is known as pellagra-typoid. Here the difficulty of separating other causes of the mental disorder are even greater. In order to diagnose pellagra-typoid it is absolutely essential to overcome these difficulties ; otherwise one might easily include amentia forms erroneously. Microscopic examinations and cultures from the blood and the cerebro-spinal fluid may reveal a possible septicæmia, often of intestinal origin. Typhoid and para-

typhoid infections, such as infections with colon bacillus, can be determined by agglutination tests. A careful examination of all the organs for foci of abscesses, pulmonary infections and the like, must be made. It is first necessary to determine the cytological and chemical condition of the cerebro-spinal fluid for the purpose of recognizing anomalous forms of meningitis. Chemical and microscopic examinations of the urine should allow us to exclude kidney affections. The percentage of nitrogen in the blood serum deserves to be determined in order not to overlook the so-called azotoæmia. If we find one of these changes in a pellagra case the diagnosis of a pellagra-typhoid is no longer permitted, and the case is to be excluded from the study of pellagra psychoses. If we use such criteria as these many of the cases described so far as pellagra-typhus must be excluded from the genuine pellagra psychoses. But there still remain cases for which this term is appropriate, and in these we may observe differential signs speaking against the classical amentia. The pellagra-typhoid often breaks out in patients who have already shown mental pellagra symptoms. One finds in them neurological symptoms which belong to pellagra, but are foreign to amentia, such as, for instance, hypertonia, abnormal exaggeration of the tendon reflexes. From the mental point of view one does not find the patients so confused as they appear (Vedrani, Rossi). They are partially accessible and often can give correct information concerning their personality. Frequently the patients brought to a hospital recognize that they are no longer at home, but they may not be able to form a clear idea of the new environment, although they can grasp the individual facts. Insight into the illness is always present, whereas the effect of the impressions of the outside world may be considerably impeded. Vivid conscious processes can still be elicited from inner excitations. Hallucinations are rather infrequent and not so manifold as in amentia. The pressure of excitement is more pronounced and disorderly in the latter, I might say wilder, than in the former (28). Pellagra-typhoid might be confused with delirium tremens, in which also the auto-psychic orientation is preserved; the anamnesis, the physical symptoms, and the peculiarities of hallucinations of the alcoholic allow us, however, to avoid this mistake. If the patient is of advanced age it becomes necessary in differential diagnosis to consider those extremely violent and rapidly fatal

states of anxious excitement which Kraepelin describes in the *præsenium*, and which, according to his opinion, may be related to other delirious states of excitement (senile delirium) of advanced age. In these cases the confusion is more like that of amentia, the motor excitement is pronounced and hallucinations are abundant.

There is another question in the relation of pellagra to psychiatry which still must be considered as unsettled, *i. e.*, the question whether pellagra as such can produce forms of dementia, quite apart from the old incorrect notion of a supposed secondary dementia as a common termination of any type of psychosis that does not pass into recovery. That the direct effect of the pellagra poison should elicit dementia symptoms seems doubtful to me. One may accept as proven that the remark made on many sides, that inhibited or confused patients are apt to be considered demented, holds also for pellagra. One must not, however, deny the possibility that in a pellagra case dementia symptoms of arterio-sclerotic origin may occur, and that the arterio-sclerosis, at least in part, might be referred to the pellagra.

Pellagra is not a hereditary disease and furnishes no hereditary psychoses (29). The offspring of pellagra cases may present a general indefinite predisposition to any disease, including mental disease, or they may show dystrophies which form from a psychiatric point of view infantilisms of various types, which, however, may also be produced by other causes.

Gentlemen, my report on the present status of our knowledge unfortunately can only corroborate the statement that this problem, which has been troubling medicine so long, still awaits a solution. We must not, however, be discouraged by this fact.

In 1871 Fontana wrote appropriately "les efforts que font les hommes pour découvrir la vérité sont donc une espèce de jeu de hasard dans lequel la probabilité de tomber dans l'erreur est très grande, et celle de trouver la vérité est très petite." The results of the study of pellagra, especially of its *ætiology*, so far justifies his judgment. May the new efforts result in a speedy discovery of the right way to the truth!

## ANNOTATIONS.

(1) In many treatises on pellagra this theory is erroneously ascribed to Strambio, one of the first pellagrologists. In the way of correction we must emphasize that this sharp critic never has expressed himself in this sense. As a matter of fact he wrote in his "Dissertazioni sulla pellagra" (Milano, 1794, p. 46), that poor nutrition "cannot by itself be the cause as some pretended," because so many in equal misery and poverty do not become pellagrous, and others who are well fed become so; hence there must be other circumstances which make poor living capable of contributing to pellagra. These views might be maintained at the present day.

(2) Zein is a protein body whose products on hydrolysis are different from those of other protein substances (Willcock and Hopkins). With regard to the value of zein as nutritive material, interesting facts can be found with Szumowski, Kossel and Soave. Lo Monaco believes that it cannot maintain the nitrogen equilibrium in the organism, and it may even do harm through its wealth of phenylalanin. Baglioni fed guinea-pigs with cornmeal to which zein was added, and he saw the animals die after 24 to 48 hours with symptoms which are similar to that of phenol-poisoning. Feeding the animals for a long time with zein results in a rise of ammonia in the urine and a decrease of urates. To this we must add that the school of Devoto (Moreschi) has demonstrated the increase of ammonia elimination in pellagra.

(3) Frappolli had an incorrect idea that pellagra was only a skin disease, and that it had to be ascribed exclusively to the influence of the rays of the sun. Strambio, however, recognized that pellagra *est morbus, desquamatio est morbi symptoma*, and he observed that the latter is dependent on the effect of the sun's rays, and that *vitam omnino umbratilem ad eam vitandam sufficere*. He admitted, however, that the general symptoms are increased as soon as the patients are exposed to the sun. With regard to the photodynamic theory, we should also mention an observation of Bouchard, who in 1877 had a pellagra case bare the forearm and expose it directly to the sun rays. One-half of the exposed skin surface was moistened with an alcoholic solution of sulphate of quinine; the erythema appeared only on the part which was not moistened. From this observation Bouchard concludes that the sun rays have an injurious effect on the skin of pellagra because the fluorescent substance is absent in it. Many veterinary surgeons had observed that calves kept in the stable during winter and fed with corn did not show morbid symptoms until spring when they were in the open.

Raubitschek's photosensitizing substance is extracted from corn by alcohol, and the corn treated in that way becomes harmless.

(4) Sette found in corn a change of which the botanists, who were consulted, among them Decandolle, did not know whether it was to be referred to *Mucor uredo* or *Licoperdon* "la pianticella velenosa che sopra il guasto grano sorge non è la causa della malattia ma lo è la degenerazione dell'olio grasso e forse della Zeina, che il cereale contiene."

Balardini ascribes the change in the corn to a fungus *Sporisorium maidis*. Lombroso thought at first the corn was spoiled by *penicillium glaucum*. Later, however, on ground of his own studies and of the studies of other investigators (Monti, Pelizzi, Babes, etc.), he believed he found the cause in many other microorganisms. When Lombroso began his investigations Balardini was a member of the Instituto Lombardo di scienze for whose prize Lombroso competed. He became an influential defender of Lombroso, and was readily persuaded that he had considered his fungi erroneously as *sporisorium maidis* instead of *penicillium glaucum*. He finally adhered merely to the nucleus of the doctrine, *i. e.*, that spoiled corn is pellagrogenous. Recently Reed expressed the opinion that the cause of the spoiling of corn is to be sought in *Diplodia zeæ*. *Diplodia zeæ* is a corn parasite which has appeared lately. It causes those alterations in corn which the Americans call dry rot or cornstalk disease. The parasite changes the chemical composition of corn, the meal becomes toxic for mice, and on alcoholic extraction it furnishes a substance which has a similar effect as the pellagrozein. We may add that not only corn itself but cornmeal and insufficiently cooked cornbread or polenta can be infected like the former and can have harmful effect.

(5) Lombroso had confided to the chemist, C. Erba, in Mailand, the preparation of the spoiled corn. He put the corn in barrels of water, and there allowed it to spoil nearly to the point of putrefaction. From the alcoholic extract prepared from this corn he extracted the so-called pellagrozein, a substance described by Lombroso as brownish-red, gluey, neutral, of somewhat bitter taste. Lombroso used for his experiments the alcoholic extract of the spoiled corn with its pellagrozein content. After the injection frogs showed increase of reflexes, tetanus, rise of temperature, with fatal termination. Among the birds, chickens, as remarked above, showed the greatest resistance. In order to kill them it was necessary to use 10 gms. of the extract per kilo. Twenty-seven grams injected in five days only caused emaciation and diarrhoea. Pigeons and falcons proved to be more sensitive. Rats would get the amount of 12 gms. per kilo to drink without any harm. The same amount injected produced torpor, refusal of food, paralysis of the hind legs, one-sided contractions. A very small *mus silvaticus* died after the injection of 2.5 gms. with tetani-form manifestations. In cats and dogs the injection of 1.5 to 2 gms. produced convulsions, tetanic attacks, dyspnoea, and death. We must add that the lethal dose of the extract amounts to what would correspond to 15 kilograms of corn for a man of medium weight.

(6) According to my own views it would not do to accept this as decided. Babes and Manicatide mixed the serum and the extract of spoiled corn before the injection, and we may well suspect that between the heterogeneous albumens phenomena of precipitation may arise and that the diminution of toxic effects may be traced to this fact.

(7) Strambio mentions among the pellagrous cases observed by him a clergyman and a druggist who ate rye-bread and used the best of food. The commission which was appointed for the study of pellagra in 1844

found pellagra cases among the miners of the Aosta Valley who then fed largely on chestnuts. In the year 1846 Cipriani, too, found pellagra among people who never had eaten corn. Similar observations were made in America by Tucker, Albright, White and Miller.

(8) There is in support of the second objection also an old observation made by Strambio, and recently corroborated in America, that cases of pellagra can occur also in the relatively well-to-do, who consume corn products rather less frequently. There further is an experiment made by Zeller, who of two groups of 56 persons each, fed one exclusively on corn products, whereas the other was altogether deprived of them. Zeller observed cases of pellagra in both groups, but rather more numerous in the latter. The adherents of the Lombroso theory naturally do not acknowledge the force of these two objections, inasmuch as even occasional consumption of spoiled corn may be sufficient to produce pellagra. Neusser found cases of pellagra in Roumania without corn diet, and he claims that the mother substances of pellagrogenous poisons may be distilled from spoiled corn and reach the organism as brandy; in Italy Antonini joins his opinion as far as concerns some cases observed by him in Friuli. In order to prove such a hypothesis it would be necessary in the first place to define the mother substances and to bring the proof that they are actually capable of distillation. The second objection is answered by Lombroso adherents with the remark that pellagra is absent in regions in which corn is used where the corn is only used in a normal condition. As a matter of fact it is, however, very difficult to determine the limits between healthy and spoiled corn, since Lombroso, himself, Babes and other toxicologists admit that corn in its ordinary condition of conservation always contains numerous microorganisms and their products, and that most of the apparently healthy corn can to some extent be considered as spoiled. Apart from this I mention Cosimo Ridolfi, who saw people eat moulded corn without any pellagra cases, and that Pieracini, in Brazil, found the corn frequently infected with *aspergillus niger* and *penicillium glaucum*. Ceni communicated at the 8th meeting of the Società Italiana di Patologia (Pisa, 25th to 27th March, 1913), that he had met with but one case of pellagra in Sardinia, and that in a man who never had tasted corn.

(9) The anti-zeists claim that in Bukowina corn was introduced in 1786. Pellagra, however, appeared only towards 1881 (Philippowich and Kluczenko). In Roumania, too, there is a long interval of time between the introduction of corn in 1700 and the eruption of the disease in 1833. In America, too, if we neglect the claim of Niles that Baruino found pellagra among Indians already in 1600, we find the following dates for the eruption of the disease established by Babcock: Illinois, 1812 (Kurella); South Carolina, 1828; New York and Massachusetts, 1860 to 1864; Missouri, 1882 (Brockschmidt); North Carolina, 1884; Georgia, 1885; Pennsylvania and Louisiana, 1893. As far as Italy is concerned, leaving out of question the claim of Sambon, who claims to have found in a work of Gerolamo Savonarola words which are held to prove that corn had been known in Italy as early as 1500, we may mention the following dates:

In Piedmont the culture of corn began in 1750, and in 1800 Boerio and Antonini found the first cases of pellagra. In the region of Brescia corn was introduced in 1774, and pellagra started in 1807. In the province Mantova corn was introduced in 1817, pellagra appeared in 1820. In Tuscany the cultivation of corn began in 1769, and in 1784 Tozzini found pellagra cases in Mugello.

It is easy to understand how the first cases of the disease must have been unrecognized in those days.

(10) Alsburg also points to the fact that the cultivation of corn spread slowly into the more northern regions where corn cannot ripen well; and that the farmers prefer those varieties which are rich in fat substances, that is, those with well developed embryo, which are more easily infected with fungi. The same investigator also speaks of the fact that a large amount of corn is imported, and it is naturally difficult to give statistical data such as those mentioned above. Those collected by Gaumer in Yucatan are interesting. There corn is cultivated and used and yet there are no cases of pellagra. In the year 1802 grasshoppers devastated the fields. Corn was then imported until 1891, and this led to the appearance of pellagra. Between 1891 and 1901 home-raised corn was used again, and the pellagra disappeared. But with a renewed importation of corn it again reappeared and spread. One naturally must not forget that in bad years the consumption of imported corn was connected with poverty.

(11) The hyphomycetes form their toxic substance on corn at the expense of starch. They also form it on chestnuts and on artificial media, for instance, Raulin's fluid, at the expense of sugar. The appearance of this substance begins with the growth of the hyphomycetes, and it is found in largest amounts towards the epoch of sporification. After this epoch the production ceases but the product does not disappear, it is found in the medium as well as in the fungus, and belongs to a group of aromatic substances and yields phenol reactions by which it usually can be demonstrated. Sometimes, however, in certain phases of culture the product is changed and loses the property of reacting to chloride of iron. The product of the hyphomycetes of corn has the formula  $C^6H^{10}O^3$ , its molecule is of cumerinic nature, and shows a tendency towards glucosidic combinations; it is formed in the same amounts on normal or on fat-free, or on pigment-free corn. From cultures of *Aspergillus fumigatus* Gosio also isolated a substance which produces extraordinarily fine needle-crystals, insoluble in water, little soluble in cold, more soluble in warm alcohol, and melting at  $141^{\circ} C$ . This substance gives the reaction of phytosterine; it diminishes or disappears when the poisonous property of the cultures is higher, which gives rise to the opinion that it has antitoxic effects as cholesterine has against saponine. Gosio's pupil Ferrati injected for a long time dogs with an extract of corn infected with penicillium and this produced the appearance of convulsions. He injected the dogs every second day with 5 cc. of the alcoholic extract.

(12) Strambio mentions that many of his contemporaries were inclined to find the cause of pellagra in the use of bitter and irritant oils "olii

aci ed irritanti." Of late Mixell has accused plant oils of being pellagrogenous on account of their content of linolin which is accumulated in the tissues, and which damages them by its oxidation process.

(13) This microorganism appears in its fundamental form as a double lancet-shaped bacillus, but it often deviates from this form and resembles cocci or is biscuit-shaped; in short it is polymorphous. It grows most readily on culture media which contains non-coagulated albumen. The blood of man and rabbits is extremely favorable for its growth. The microorganisms can readily be stained with a watery alcoholic solution of fuchsin or with Löfflers blue; it resists Weigert, but not the Gram reaction.

(14) Tizzoni ascribes great importance to many experiments on monkeys. He observed in his animals fatigue, contractures, diarrhoea, alopecia. These manifestations are too indefinite to permit us to speak of pellagra. Moreover the significance of these experiments is somewhat uncertain because the animals had been injected formerly for other experiments with the colon bacillus.

(15) Nor are the immunity experiments of Tizzoni evidence in favor of the specificity of the microorganism. He found that the serum of pellagra patients precipitates the extract of cultures of his bacillus in a relation of 1 to 10. It may well be that we deal here with non-specific precipitation reaction between human and cultural albumen. The agglutination experiments show that the bacillus is agglutinated by pellagrous sera of fresh cases in a ratio of 1 to 10 to 1 to 20, and a ratio of 1 to 100 to 1 to 200 if the disease is not acute. Apart from the fact that these figures are a little too low for specific agglutination phenomena, one might explain the experiments in the same manner as those of Babes, that is, that the serum of pellagra cases whose blood may contain bacteria not specific for the disease will produce agglutinins for them.

(16) Ramella found the bacillus in four pellagra patients. He himself does not exclude the possibility that he might be dealing with an ordinary microorganism which might have entered the circulation. Terni examined 89 cases. In the blood of 17 individuals he found the strepto-bacillus, in 40 other microorganisms and rare specimens of a bacillus similar to Tizzoni's bacillus. In 6 cerebro-spinal fluid he found only once the strepto-bacillus. Fifteen control experiments in normal persons were negative. We further must mention Bass, who from the faeces of pellagra patients and from corn-bread which had been used by them, isolated a bacillus, which in chickens when given with corn food produced a slight emaciation, a foot erythema, and diarrhoea. Experiments of the Pellagra Commission in Illinois speak against infection theories of this kind. Twelve Macaques were injected with blood, cerebro-spinal fluid and organic emulsions of pellagra cases, but there appeared no pellagrous alteration.

(17) In the year 1864 Pari expressed the opinion that pellagra might be caused by *ustilago maidis*. This fungus produced on the corn plant that disease which the Italians call carbone. According to Pari this fungus gets into the human organism through corn or also through other

food articles on which it settled from the air in the farmhouses where it is brought with the harvest. Up to this point the doctrine might be at least worthy of discussion. Later, however, Pari completed it with paranoic ideas. He supposed that the substance of the fungus, fungina, settled in the cutaneous tissue where it causes the alterations when burned by the sun's rays.

(18) *Aspergillus fumigatus* gives us very violent poisons, producing convulsions; *varians* gives poisons of variable nature and intensity; *niger* gives poisons of a depressive nature. *Penicillium glaucum* A gives poisons of a depressing and *penicillium glaucum* B poisons of an exciting nature. As has been said above these properties may change in one and the same hyphomycetes so that it cannot be used to determine the different types. Ceni believes that these changes are connected with the biological cycles of these fungi. *Aspergillus fumigatus* and *flavescens*, especially the former, cause severe rapidly evolving pellagra forms. *Aspergillus niger* and *ochraceus*, and especially the penicillia, represent the cause of the chronic forms. Ceni found that penicillia found in Germany and not active there get poisonous properties in Italy. Otto saw the pathogenic property of an *aspergillus fumigatus* of Italian origin reduced in Germany and disappear.

(19) Ceni adheres to the claim that the substratum (medium) on which the fungi grow is free of the poison-producing substances, which, however, is firmly denied by Gosio and others. The periodicity of the poisonous property of the hyphomycetes is disputed from many sides (Paladino, Blandini, Tiraboschi, Pighini and Ravenna). Several investigators also deny absolutely the toxic property (Stürli); whereas the same is accepted by others, as by Alsburg and Fossati. The latter observed that the toxic properties can be accentuated by toxins of a coli-like bacillus isolated from corn-bread.

(20) From a historical point of view, Carraroli may be mentioned, who for many years labored with the problem of the aetiology of pellagra. He believes that it is caused by a pleomorphous organism. His doctrine is, however, on such a foundation that it cannot be given any scientific consideration.

(21) In Italy the Commissione Pellagrologica could not find any connection between simulia and pellagra. Physicians who practice in pellagra regions made the same observations (Grillo, Ceresoli, Terni). Pellagra is frequent in the lowlands of Lombardy and Veneto, where there are only stagnant waters which offer no favorable conditions for the larvæ of simulia. Babes found in Roumania regions full of simulia without pellagra; for Bessarabia Mitchnik denied the connection of the disease with this insect; the same views are represented in America by Niles, Beal, Ravitch and Hunter. The zoologists found that in North America *simulium reptans* is absent. With regard to Sambon's theory, we may remark that all proof is lacking that pellagra follows the bite of the simulum in pellagra regions. Whereas laborers are attacked by pellagra, other persons, such as managers, are spared, although they often remain

with them in the field, and are also bitten by the simulium. This fact is difficult to explain by Sambon's theory. It does not hold for other diseases of protozoic nature, for instance, malaria. We further may add that the above-mentioned Commissione Pellagrologica Ministeriale advances against Sambon's theory the observation that it has never found any pellagra cases in infants. The parasitic nature of the corpuscles found by Sambon in one case in cells of the cerebro-spinal fluid is not proved as yet. The opinion of Ravitch that the agent producing pellagra might be a trypanosome carried over to man by the prick with the bill of blackbirds deserves only a passing mention. The adherents of a protozoan theory claimed indirect support in the observation that the Wassermann reaction in pellagra cases frequently is positive. Control experiments by Vallardi, a pupil of Devoto, show, however, that that is not the case.

(22) In order to make as complete an enumeration of these theories as possible, I recall that Rameau ascribes pellagra of the country of "Landes" to a parasite which is transferred to man by the skin of the sheep. A short time ago Manning described a *psylosis pigmentosa* which he ascribes to pellagra and which he claims is transferred by clothes.

(23) Zuntz claims that a corn diet calls for a great increase of the oxygen consumption, about 25 per cent.

(24) The results of these general statistics are supported also by more circumscribed ones. The 22,000 pellagra cases in the province Padova, in the year 1899, came down to 10,000 in the year 1909 (Alpago Novello). In the provinces Pesaro and Urbino (D'Ormea) and in Lombardia (Bezzola, Terni, Perroncito) pellagra has receded considerably.

(25) The often mentioned prominent pellagrologist, G. Strambio, occupies himself with the mental phenomena of pellagra, and writes "delirium duplex est, unum acutum, diuturnum alterum.

Primum ad paucos protrahitur dies non sine vita discriminé, febri stipatur irregulariter exacerbante cum pulsu celeri et duriusculo. Delirium diuturnum modo amentia, modo mentis stupiditas, modo melancholia dici potest.

In prima pellagrosi ad recte ratiocinandum inepti omnia prætermittunt rident, lugent. In secunda . . . stupidi et oblivious ne objectorum quidem impressiones attendunt.

Tertia tandem, quæ est fræquentior, sæpe religiosa est, attonita, errabunda et tristis. Etenim nonnulli judicia Dei metuentes diem et noctem preces fundunt, alii cogitabundi et immobiles interroganti minime respondent, plurimi hominum frequentiam fugiunt, quo vadant nesciunt, nec desunt qui eo deveniant ut vitæ pertæsi se laqueo suspendant aut præcipites in puteum descendant." As we turn over the leaves of the handbooks of psychiatry we find that Tanzi believes that the psychosis which regularly occurs in pellagra is amentia. The same opinion is represented by Bianchi, but he remarks that these psychic symptoms are of very variable nature. A. Marie accepts confusion as the most frequent symptoms, but he also found often depressive states of stupor. Kraepelin writes, "the mental

disorders show the picture of increased emotional irritability; moreover depressive states, of uniform course with dullness, scanty delusion formation, marked tendency to suicide, and termination in deterioration, and finally confusion with excitement." He, however, leaves open the question whether all these forms constitute a clinical unit, and are solely to be traced to the effects of toxins. Among the other investigators Finzi believes that all the mental phenomena of pellagra are to be referred to the picture of amentia. Vedrani expresses himself to the effect that they have certain peculiar tracts, many of which I could confirm. Ziveri accepts two forms, an amentia and a depressive type. Gregor divides them into seven groups (1) simple pellagrous neurasthenia; (2) severe neurasthenia with depression and delusions; (3) confusion; (4) acute delirium; (5) catatonic dementia; (6) melancholia; (7) circular forms. Kozowski found in 90 per cent of the cases amentia, in 8.7 per cent melancholia, in 1.3 per cent catatonia. Williams considers amentia as the psychosis of pellagra.

(26) Bouchard wrote that pellagra was a "matière sans forme"; a disease without form is in the language of the scholastics an impossibility, a thought worthy of one who has lost his way in the depths of the school and in metaphysical mists. This judgment is certainly too severe, but one must admit that the symptomatology of pellagra is really not uniform. Nils even writes that in order to describe pellagra one would require the imagination of Carlyle and the pictorial expressions of Macaulay.

One of the most important objective findings, the erythema, is not to be found in every stage of the disease, and has not in every case characteristic features. The seat of the erythema is dependent on the accessibility to the sun's rays, therefore it is most frequently found on the dorsum of the hands. Even Strambio wrote: "hinc saepe accidit ut agricolis qui dum agrestis incumbunt laboribus soluto indusii collari, inversis manicis et calcis detractis procedunt collum, ingulum, sternum, brachia, pedum dorsus et tibiæ hujusmodi quoque corripiantur desquamatione." In Roumania, where peasant children expose themselves almost naked to the sun rays, the erythema spreads over the whole body; therefore neither the "gloves," nor the "collar," nor the "neck butterfly" has a decisive diagnostic value. Merk, who studied the principal phenomena of pellagra for a long time, admits that many alcoholics erythema can be observed which are very easily confused with those of pellagra. Majocchi found certain distinctions between the erythema of pellagra and of alcoholics. In the alcoholic it forms (a) no sharply limited glove on the dorsum of the hand; (b) it lasts longer, and comes to the pigmentary stage later; (c) it appears in any season; it also lacks the collar and the changes in the face show the marks of telangiectasis. Professor Bosellini told me verbally that in Bologna he saw erythema in alcoholics which could certainly not be distinguished from the pellagrous forms, especially in years in which wine was extremely cheap. In the advanced stages of many psychoses there also are changes of the skin which are similar to those of pellagra. Baillarger spoke of the so-called pellagra of the insane.

(27) Antonini injected the blood of pellagra patients into rabbits, and Gosio intracranially into pigeons or mice, and they claim to have proved that this blood was more toxic than normal blood; but this method cannot be brought under consideration for diagnostic purposes. Gosio published a precipitation method based on the relation between corn and pellagra, a relation which we have already designated above as rather loose. The poisons of the hyphomycetes injure the intestinal epithelium so that corn albumens without being previously subjected to digestive processes enter the circulation, form antibodies which exert a precipitating quality against corn albumen solutions. These precipitins are absent in the blood of non-pellagrous corn consumers because their intestinal tract is normal. Rondoni and Raubitschek found, however, that this reaction is specific neither for pellagra nor for corn consumers. These precipitin reactions are probably to be connected with the observations of Vilenko, who found that many plant proteids form precipitates in contact with animal sera. D'Ormea and Gatti found that the serum of the pellagrous formed precipitates with the extracts of emulsions of internal organs of pellagrous cases. Lucatello immunized rabbits with blood serum of pellagra cases and found that the serum of the rabbits acquired the property of causing precipitation with the serum of such patients. He himself, however, admits that the precipitation is not specific, a thing that was to be expected. Experiments with deviation of complement were tried by Lucatelli, Carletti, Alvisi, and the Pellagrological Commission of Illinois. The tests turned out in such a manner that one can speak neither of a constant nor of a specific reaction. Rondoni found no specific reaction of deviation of complement with corn extract and antigen. The anaphylaxis reaction used by Volpino is found non-specific by many others. As has already been mentioned in the lecture, Volpino and his collaborators observed in pellagra cases on injection of watery extract of spoiled corn phenomena of hypersensitivity (increase of the temperature above 38 per cent, stupor, excitement, acceleration of the pulse and respiration, vomiting, diarrhoea, and in many cases the appearance or aggravation of cutaneous symptoms). A short time ago Volpino communicated the fact that it is possible to obtain a substance from healthy corn by means of precipitation with alcohol and extraction which in animals fed without corn does not have any toxic effect, whereas it has a toxic effect when the animals are fed with corn. This substance, called pellagrogenina, is water-soluble and does not lose its toxic properties by heating. 90 per cent of the pellagra cases react strongly to the injection of a one per cent solution of this substance. In 100 non-pellagra patients only 20 per cent reacted positively. The watery not precipitated extract of healthy corn causes no reactive phenomena in contrast with the extract of spoiled corn. As a consequence Volpino assumes that in the watery extract of healthy corn there may occur other substances beside pellagrozein inhibiting the reaction. The experiments of the Pellagrological Commission of Illinois, aiming at reaction of local oversensitivity with healthy or spoiled corn extract or with *Aspergillus fumigatus*, have failed. Hirsch-

felder had the same experience. The mejostagmyn reaction gave no results.

(28) I should like to mention here that Gaetano Strambio has already made this observation. As a matter of fact he wrote: (*Dissertazioni sulla pellagra, 1794, p. 16*) *il delirio dei pellagrosi non è accompagnato da quel furore, da quell'audacia . . . che caratterizza la vera mania.*

(29) Certain investigators have been of the opinion that pellagra cases pass the germ of the disease to the children. Strambio, however, thought that children only got the predisposition to the disease so that they might be attacked earlier than the parents. Tizzoni tried to revive the old conception of heredity because he finds his streptobacillus in the tongue of one of the female guinea-pigs infected by him. The finding does, however, not mean more than that this microorganism is transferable, but it cannot have anything to do with the heredity of pellagra. Moreover it is necessary to first get a demonstration of its specificity for the disease. Also the experiments of Ceni, who derives from the eggs of normal hens 88 per cent normal chickens, and from those fed by spoiled corn or emaciated only 29 per cent, proved only that the poor organic condition of the progenitors influenced the chances of development of the progeny.

## PSYCHIC DISTURBANCES ASSOCIATED WITH DIS- ORDERS OF THE DUCTLESS GLANDS.\*

By HARVEY CUSHING, M. D.,

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During my last two years in Baltimore I saw rise from the ground the clinic whose inauguration we are here to celebrate, and in this interval became acquainted in a measure with the methods of examination pursued by its director, whose sympathetic interest in our surgical performances and study of the mental aspects of some of the patients under our care served to show my immediate associates and myself the great value of these analyses, which from our insufficient training we had perforce neglected.

But in spite of my many obligations to Professor Meyer, his compelling invitation to participate in these exercises other than as a sympathetic listener would nevertheless have been refused had it not been for the chance coincidence of its reception with the following episode, which furnishes me with the text on which I shall venture to speak.

A physician of one of the large Massachusetts hospitals for the insane, after the perusal of a monograph in which occurred certain vague statements regarding the mental characteristics of individuals suffering from disorders of the pituitary body, brought to the Brigham Hospital a number of photographs and clinical histories of patients who had been under his observation and asked whether any of them promised to be worthy of investigation from the standpoint of a primary or coincident derangement of the internal secretions. One of his case records fully analyzed the mental status of an individual in whom recently acquired adiposity, lethargy and polyuria were conspicuous features, and as chance would have it there happened to be under our own care the physical counterpart of the asylum inmate—a patient, however, whose case history had been elaborately worked out from the standpoint of a secretory disorder but in which only fragmentary comments had been made on the associated psychoses.

\* Address delivered at the opening exercises of the Henry Phipps Psychiatric Clinic, The Johns Hopkins Hospital, Baltimore, Md., April 16-18, 1913.

This Brigham Hospital patient, J. H., is a man of 38 with an extraordinary degree of obesity, polyuria, a high assimilation limit for sugars, and radiographic evidences of an hypophysial lesion.

About five years ago he first began to grow stout and drowsy, and in the words of his wife would "come home and sit around and say nothing and read nothing, but would worry, cry and insist that he was incurably ill." Various diagnoses were made, which confused and alarmed him. He became impotent.

During his periods of depression he would stop work and then try to resume it under various conditions of employment, but would again become lachrymose and discouraged and desist in the attempt. This went on for some three years. In January of 1911 he secured his last temporary job in a butcher's shop, but drowsiness would overcome him even when driving the cart and he was discharged.

His wife describes two kinds of somnolence. From his usual nocturnal sleep he could be easily aroused without showing irritability; but from the lethargic spells which occurred during the day it was almost impossible to fully awaken him, and he would strike out at the nearest persons, crying "Get away!" During these periods of deep, overpowering diurnal sleep he would at times respond to questions, though without subsequent recollection of what had been said.

Two weeks before entering the hospital he suddenly complained of being lonely, wanted a light in every room and demanded that his wife play and sing to him and that his relatives be called in, for he was "never going to get well."

The counterpart of this individual—the patient at the Danvers Asylum—has gone through a very similar preliminary period of hypersomnia with rapidly acquired adiposity. His associated mental symptoms seem to have been no more marked than in the case of J. H. recorded above, until a year ago when after an injection of salvarsan, given for no apparent reason, he became acutely deranged. In his non-somnolent periods he now shows a good-natured distractibility with disorientation and sexual obsessions.<sup>1</sup>

This episode merely illustrates a common failing—the tendency of a specialist to narrow his attention to those aspects of his patient's condition with which he is most familiar, while other and possibly contributing factors in the symptom-complex remain out of focus. The experience, however, plainly intimates the existence for the psychiatrist of a little used point of contact with internal medicine and, as others have already seen, a possible bio-

<sup>1</sup> Both of these individuals are afflicted with an hypophysial and possibly with a polyglandular insufficiency, of which obesity is the most obvious physical expression, and in view of the associated mental symptoms it is of interest to recall that Vitaut added a fourth—namely psychoses—to the three cardinal symptoms under which Dercum first described "adiposis dolorosa."

chemical explanation for that considerable proportion of the mentally deranged in whom, as experience has shown, a post-mortem examination is likely to reveal no obvious organic lesion in the central nervous system. It indicates also for the clinician—who too often looks upon the individuals under his care as essentially visceral rather than as cerebrate organisms—the necessity for the same routine analysis of his patients' mental status that is commonly given to the alimentary, circulatory, excretory, neuromuscular and other functions.

Many of us—and perchance this applies more particularly to those who are manually inclined—have long reconciled ourselves to the mental characteristics which rendered us as collegians incapable of the successful pursuit of psychology, and as prospective physicians equally awkward in meeting the elusive psychiatry on a social footing though we may have had a bowing acquaintance with her relative, neurology. But these subjects, under such favorable opportunities of presentation as will be afforded by the Phipps Psychiatric Clinic in direct connection with a university hospital, will doubtless prove as intelligible and be as eagerly followed by the average student as any in the curriculum. They are unquestionably as important, for our patients do not prove to be solely visceral organisms, and it behooves not only the physician but the handcraftsman also—as perhaps Crile more than any other of my surgical confrères has appreciated—to realize the existence of a psychic organization in the background of even surgical maladies.

Unconsciously or otherwise all clinicians are psychotherapists, and undoubtedly he is the more successful with his patients who effectively uses this agency to allay the individual's morbid depression or doubts, anxiety or fears. A certain functional superstructure builds itself on even minor ailments. Of this we are all more or less appreciative. At times these so-called functional symptoms may be paramount, even when the associated organic lesion is more or less obvious; and some of us, with greater or less skill, may satisfactorily analyze and even partially dissipate them, while the underlying disorder remains unassailed.

This is even more apt to be so when the primary lesion is an intracranial one. Thus the clinical histories of a long series of cases of brain tumor have shown that a large percentage of the

subjects at one time or another in the course of the disease have been regarded as the victims of a functional psychoneurosis, and the same is doubtless true of many other extracranial organic disorders which cannot be diagnosed off hand. Conversely, it is even more common for a physician or surgeon to eradicate or otherwise treat the obvious focus of disease, with more or less success, and to leave the mushroom of psychic deviations to vex and confuse the patient for long afterwards, if not actually to unbalance him. Unhappily for those of us who lean upon instruments of precision there is no acceptable psychometer from which we may take readings—nor will there be.

All of this is doubtless very trite, though it bears, as I shall endeavor to show, upon the more specific subject matter of this paper—the internal secretions and their effect upon mental processes.<sup>3</sup>

We are coming to realize more and more that new interpretations of certain conditions of disease, new avenues of investigation, new lines of therapy, are being opened up by the present intensive studies of the ductless glands and their chemical correlation. There has been a rush for this opened door, particularly on the part of clinical therapeutists lured on by high-sounding proprietary preparations, and unless restraint is exercised there is every danger that the experience of Brown-Sequard and the Elixir of Life will be repeated in the case of other glandular secretions.

Acknowledging the close functional interrelation, whether as protagonists or antagonists, of the ductless gland series, it is nevertheless safe to assume as a working basis that for each member of the series a state of overaction or of underaction produces its peculiar symptom-complex.

Some of these syndromes are now well recognized, particularly those due to glandular insufficiencies, for the secretory deprivation may occur in man as the result of disease or surgical ablation, or

<sup>3</sup> Attention should be called to the following admirable and suggestive papers on this same subject:

Arthur Münzer: Ueber die Einwirkungen der Blutdrüsen auf den Ablauf psychischer Funktionen. *Berl. klin. Wehnschr.*, 1912, xlix, 582, 649. Ueber die ätiologische Bedeutung psychischer Insulte bei Erkrankungen der Blutdrüsen. *Ibid.*, 1165.

L. v. Frankl-Hochwart: Ueber den Einfluss der inneren Sekretion auf die Psyche. *Med. Klin.*, 1912, viii, 1953.

its counterpart may be produced in animals by experimental removal of the structure in question. Thus eunuchism, Addison's disease, pancreatic diabetes, myxoedema and the cretenoid state, tetany, the so-called adiposogenital dystrophy with infantilism, representing hypophysial, and the precocious skeletal and sexual development, representing pineal deprivation, are known to be clinical expressions of a primary deficiency of individual glands.

Less well recognized—for we cannot as yet reproduce them experimentally—are the constitutional manifestations of a perversion or excess of secretion, Graves' disease and acromegaly being the only acceptable illustrations of such states; whereas we are but feebly groping for the characteristic syndromes representing primary functional hyperplasias of the thymus, of the adrenal bodies, of the interstitial cells of the reproductive glands and so on.

With this conception that a primary secretory derangement, in one or the other direction, of each member of the series is coupled with its own peculiar and recognizable syndrome, we are not blind to the fact that there may lurk in the background, particularly in the case of the glandular hyperplasias, either some underlying biochemical disorder of nutritional, infectious, or otherwise toxic sort, or some primary derangement of the nervous system itself. In the case of the thyroid, for example, exophthalmic goitre with its outspoken nervous and psychic manifestations was formerly regarded as essentially a sympathetic or psychogenic disorder, and among others Biedl has again come to support this view as opposed to that of Moebius. Unquestionably the mental repose from successful psychotherapy on the one hand, and on the other such a radical measure as the blocking of secretory impulses to the gland by cervical sympathectomy, have both served, in many cases, to ameliorate the symptoms almost as effectively as the now popular partial extirpation of the hyperplastic gland itself. Cannon's experimental studies have given evidence that the secretory discharge of one of the glands—the adrenal—is influenced by way of the sympathetic system through an emotional excitation. Abundant clinical experiences have shown that psychic traumas play an important rôle in hyperthyroidism; and Weed, Cushing and Jacobson's demonstration in animals of an autonomic control for the pituitary body by way of the cervical sympathetic, similar to that for the adrenal gland by way of the

splanchnic fibers, indicates that this structure also must be taken into consideration when interpreting the results of emotional discharges of the glands of internal secretion, at least when measured by the consequent glycosuria.

Within normal physiological limits individuals differ greatly—by right of inheritance, by the cultivation of inhibitions, through circumstances of disease, and in other ways—in the character and degree of their secretory response under the influence of the primitive emotions. It has become popular to speak of the sympathetic tonic individual, in the sense of Eppinger and Hess,<sup>8</sup> as one in whom these discharges easily occur, and the vagotonic or more phlegmatic individual as one who responds less readily to the same stimulus. Both may be physiologically normal, but the former is emotionally or autonomically the more unstable, and under mental stress more easily becomes glycosuric or exophthalmic and shows polyuria, palpitation, haemodynamic responses and so on—symptoms which under especial psychic durance may acquire a sufficient chronicity to lead to a so-called symptom-complex of disease.

Dr. Smillie, an assistant of my colleague, Prof. Christian, has made an interesting observation on the urine of a group of students before and after the emotional strain of a written examination. A transient glycosuria was demonstrable at the end of a difficult three-hour examination in five out of 14 students, and after a less severe two-hour test, in three out of 20 students. These doubtless represented the sympathetic tonic members of the group, who happened to possess a storage of available glycogen at the time of the experiment, but whether the emotional discharge affected more the adrenal, thyroid or hypophysis, or all of them equally, can only be surmised.

Certain observations in my own laboratory conducted by Dr. Bagley suggest that after extirpation of the superior cervical ganglia, with consequent blocking of secretory impulses to the pituitary gland, the animal acquires an increased sugar tolerance with a tendency to the deposition of fat, such as occurs after

<sup>8</sup> Individuals who react strongly to atropin and pilocarpin are insensitive to adrenalin, and conversely individuals who show evidences of strong sympathetic irritation to adrenalin are resistant to the effects of pilocarpin or atropin.

actual posterior lobe extirpation; and thus we may possibly be able to diminish an individual's relative sympathetic tonicity and to lower the threshold of glandular discharge in so far as it is affected by emotional stimuli. Indeed it has always seemed probable to me that the beneficial effects of vascular ligation in Graves' disease may be due to the division of the sympathetic fibers to the gland rather than to the lessening of its blood supply—to which such improvement as occurs is usually attributed.\*

These things all tend to emphasize the fact, of which you are already aware, that psychic conditions profoundly influence the discharges from the glands of internal secretion, but we are on a much less secure footing when we come to the reverse, namely the effect on the psyche and nervous system of chronic states of glandular overactivity or underactivity.

However, inasmuch as an established secretory disorder on the part of each individual gland leads to certain clinically recognizable chemicophysical alterations in the body, it is fair to assume that each of the resultant clinical types will exhibit more or less characteristic mental deviations; for the influence of the somatic condition on the mind is certainly as great as that of mind on body. These disturbances naturally enough are particularly apt to occur during periods of physiological stress, such as accompany puberty, the climacteric and pregnancy—states in which there are profound alterations in the functional activity of the glands of internal secretion with a necessary readjustment in the chemical balance of the body, which must in more or less nervously unstable individuals have a profound effect on their psychic organization.

Of late years attention has been largely concentrated on thyroid disorders, for reasons which are quickly apparent. The gland is so situated that changes in its form through hyperplasia or atrophy are often observable; its accessibility has made it the subject of surgical attack, so that the consequences of glandular deprivation have been made clear; in short we have come to recognize, under the influence of Moebius, states of hyperthyroidism versus hypothyroidism even in their more or less incipient or

\* It is possible on this basis that a bilateral sympathectomy may prove to be a no less promising form of treatment for acromegaly in its acute stage when glycosuria is an expression of the disorder.

transient stages, and to appreciate more or less clearly that each of these states is accompanied by a greater or less deviation from the normal mental poise, depending on the severity of the disease and the relative stability or otherwise of the individual's nervous system.

It is quite probable that in similar fashion a disorder primarily involving any other member of the ductless gland series leads not only to its peculiar somatic alterations but also to an accompanying and characteristic mental change. Castration, for example, unquestionably modifies the psychic as well as the physical attributes of an individual, but even in this well-known illustration of the consequences of glandular deprivation it is not entirely clear how much is due to the loss of the purely reproductive, and how much to the loss of the interstitial cells on which the secondary sexual characters depend. Even less well understood are the effects on the nervous system of disorders of other glands. Psychic disturbances, in the nature of acute hallucinatory confusion, accompany parathyroid tetany as described by Frankl-Hochwart; diabetes has its psychasthenic symptoms; Addison's disease too has its characteristic psychoses, and the interrelation is emphasized in this connection by the fact that anencephaly is accompanied by an extreme aplasia of the adrenal cortex.

All these things are merely suggestive, and not until a wide experience has made it possible to analyze these conditions in a large group of patients, rather than as isolated individual experiences with a few cases, can their peculiar physical type and the characteristic mental deviations brought about by the altered chemistry of the tissues be attached in turn to disorders of the less well observed glands, as has been done in the case of the thyroid.

However, in regard to the psychoses associated with derangements of one of these structures—the pituitary body—I may venture to speak with a little less vagueness. It has been said elsewhere\* that in the general run of patients suffering from hypophysial disease some deviation from the normal mental balance may occur, for two distinct reasons. One of these is the implication of the structures not only of the interpeduncular region but even of the frontal lobe and possibly the corpus

\* The pituitary body and its disorders. J. B. Lippincott Co., Phila., 1912.

callosum, through the slow pressure deformation brought about by a tumor, whether the growth, in the character of a glandular hyperplasia or adenoma, actually originates from the hypophysis itself, bursts through its dural capsule and thus invades the cranial chamber, or whether it originates in some extrasellar or infundibular anlage in consequence of a fault connected with the development of the pituitary body. In the latter case the cerebral disturbances need not be unlike those which accompany a tumor of any sort implicating this part of the brain, and dispositional changes, disorientation and so on are not uncommon. Indeed, from observations in a series of patients with primary frontal lobe tumor we are convinced that though the intellectual faculties suffer most from a lesion affecting the leading hemisphere, nevertheless the indications of a right frontal involvement are almost equally characteristic, and over-familiarity, untidiness, facetiousness, with a peculiar indifference to or lack of appreciation of the character of the malady are common.

The other, and in our present connection more important, cause for psychic change is attributable to the alteration in the secretory activity of the gland itself, irrespective of a co-existent tumor formation. Indeed, after experimental deprivation of the gland marked dispositional changes occur, though admittedly they are difficult to measure or describe in the case of the lower animals.

The effect on the mind of the hypophysial hyperplasias, physically recognized as gigantism and acromegaly, may deserve first consideration, though outspoken grades of the former state are comparatively rare. The mental attributes of the pathological giant have often been portrayed. Rabelais has done this for us, and, as Dock has well said, we recruit from giants more drum-majors than prime ministers. The giant Turner, the single striking example of this condition occurring in my series, had never learned to read or write, and though possessing shrewdness and self-reliance—by no means a simpleton—he was nevertheless dull, lethargic and indifferent at the time he came under our observation.

The acromegalics, apart from their early subjective discomforts, possibly suffer from as distinct psychic changes as do the victims of hyperthyroidism, and though a considerable percentage of the cases I have studied have been in a stationary stage of the

disease or had begun to show signs of actual secretory insufficiency, others were struggling against the despondency and hypochondriasis so sympathetically pictured by Dr. Leonard Mark in the record of his personal malady.\*

He graphically describes the recurring periods of "feeling acromegalic"—periods in which there was an intensification of the sensation of ~~hopelessness~~, lethargy and depression, and which in an individual who faced the struggle of life with less courage might easily have led to self-destruction. One of my own patients, also a man of refinement and education, has likewise written a detailed account of his personal experience with the disease and tells the story of his fight against the psychic incapacitations of the malady in very similar vein. He had been, if anything, intellectually precocious, had entered college at an early age and was valedictorian of his class; and the "slowing up" of his mental processes, with the onset of his now outspoken disorder and the periods of "feeling his acromegaly" more than at other times, are experiences akin to those of Dr. Mark. On the whole a courageous optimism in the face of physical adversity has characterized both of these individuals, and I judge that as a rule it is rather characteristic of the disorder.

Only three of the 30 or 40 acromegalics in the series have shown mental aberrations which were outspoken. These were hypersensitive women and all three were in a fairly acute stage or recrudescence of the malady. In one of them fits of despondency with the threat of suicide were sufficiently pronounced to justify the suspicion of manic-depressive insanity. Her acromegalic changes had become apparent before the birth of her third child, and her psychoses were perhaps intensified by the fact that this child became physically and sexually bizarre—a matter to which I shall return in considering the transmissibility of these secretory disorders. She ultimately committed suicide. The recent literature contains frequent allusions to similar mental deviations in the victims of acromegaly, and I presume that a sprinkling of acromegalic individuals will be found in the case records of all asylums and psychiatric clinics.

\* *Acromegaly: a personal experience.* Balliere, Tindall & Cox, London, 1912.

Realizing as we do, through the observations of Erdheim, Stumme and others, what extensive cellular changes occur in the pituitary body during pregnancy, it is quite possible that many of the psychoses or insanities associated with this state are coupled with disturbances of the internal secretions. It should be emphasized, however, that in pregnancy as well as in the active stages of acromegaly which we have been considering we are probably dealing with the effect of hypersecretion on the mental processes, for those cases of acromegaly which in their later stages pass over into what may be called pituitary myxœdema are characterized more often by the drowsiness and indifference and even euphoria of hypopituitarism.

In the case of the hypophysial insufficiencies we have a condition capable of experimental reproduction in the lower animals; and the adiposis, hypersomnia and sexual dystrophy which commonly follow the removal of the pituitary gland in adult animals, and the persistent infantile aspect and behavior of those deprived of the gland early in life, are the counterparts of the conditions seen in human beings afflicted with a corresponding secretory insufficiency due to tumor, anomaly or disease.

The complexities of the subject are considerable, on physical as well as psychic grounds—much more so than, for example, in the case of the thyroid deficiencies represented by cretinism or myxœdema. A number of physical types are recognizable, depending on whether the process antedates or follows adolescence, on whether or not there is a complicating dystrophy of the sexual sphere, or on whether or not there is an accompanying adiposity—for there is a lean as well as the now commonly recognized fat type of these individuals. Moreover, we are dealing with a dualistic structure, and are as yet merely groping toward a clinical differentiation between disorders of the separate lobes of the gland—pars anterior, intermedia and posterior.<sup>1</sup> Then too the glandular incapacitation may be brought about by a number of different agencies—by remote intracranial lesions, particularly those which occasion an internal hydrocephalus and implicate the gland through the medium of cerebrospinal fluid stasis; by the direct pressure of tumors which are immediately superimposed, these

<sup>1</sup> Concerning the symptomatic differentiation between disorders of the two lobes of the pituitary body, etc. Amer. Jour. Med. Sci., 1913, cxlv, 313.

usually being congenital cystic growths arising from an anlage of Rathke's pouch; and, lastly, by those cellular enlargements, hyperplasias or adenomas of the gland itself which from lack of a better understanding of their nature I have grouped under the old term of "struma"—a goitrous condition of the pituitary body.

As a rule most of these individuals become distinctly vagotonic, the skin is dry, delicate and comparatively hairless, there is an abnormally high assimilation limit for sugars, coupled often with an unusual deposition of fat, the temperature tends to be subnormal, and they are apt to show a mental and physical inactivity, at times amounting to lethargy. They appear, moreover, to have a special predisposition to epileptiform attacks; and this, it may be added, is characteristic also of hypophysectomized animals. It is not at all surprising that pathologists who have found congenital suprasellar tumors in the interpeduncular space accompanying these states have postulated centers for somnolence, diuresis, glycosuria and so on in the tuber cinereum, to involvement of which, rather than to an implication of the supposedly unimportant though adjacent hypophysis, the various symptoms have been attributed.

Had it not been for the fact that in the presence of tumor certain recognizable types, physical and mental, actually occurred, we could not have ventured to ascribe similar types, in the absence of neighborhood symptoms,\* to an implication of the pituitary body. This, of course, is but a repetition of our past experience with cretinism and myxedema. In the syndrome to which Fröhlich first drew general attention, a tumor—often from a congenital pharyngeal anlage whose presence may or may not be evidenced by a radiographic enlargement of the pituitary fossa or by optic atrophy with hemianopsia—is accompanied by an infantile skeletal configuration with tardy epiphysial union, an abnormal deposition

\*In the examination of patients with hypophysial disease it has become a convenience to subdivide the symptoms into (1) those produced by the local pressure effects of the growth on neighboring structures, chiasm or oculomotor nerves, uncinate gyrus and so on; (2) those the consequence of an increase in intracranial tension—choked disc, headache, or other pressure symptoms, which are usually late manifestations if they occur at all and which are frequently due to obstruction of the foramina of Monro from an enlarging growth; (3) the evidences of secretory derangement on the side of hyper- or hypopituitarism; and (4) the polyglandular symptoms attributable to a coincident or secondary involvement of the correlated glandular structures.

of fat, and delayed or imperfect acquirement of the secondary sexual attributes—the so-called adiposogenital dystrophy.

However, even in the demonstrable presence of one of these tumors with symptoms which antedate adolescence, the clinical picture is capable of kaleidoscopic variations, both from the physical and mental standpoint. The dull, lethargic, fat child, efforts to stir whom into some sort of competitive activity are futile, may, from a skeletal standpoint, be overgrown instead of infantile. A fairly normal adolescence may have been acquired and the individual may marry and beget offspring and lead a normal mental life before actual signs of glandular insufficiency appear. He may never go through the lethargic, adipose phase, or indeed even in this phase may show intellectual precocity rather than the reverse.

A few illustrations may be given.

A child 9 years of age, of Jewish parentage, one of a family of six otherwise healthy children, first came under observation *March 28, 1912*, with the complaint of headaches and cessation of growth. She was apparently normal in all respects until her fifth year, when she had an attack of measles, followed by *purpura haemorrhagica*. She subsequently suffered from headache and frequent epistaxis. She became exceedingly fat, weighing 60 pounds at 6 years of age. There was no subsequent increase in stature, and when she was 9 she wore the same sized frocks that she had worn three years before. She was regarded as a sporadic cretin and thyroid preparations were administered.

Intellectually she was rather a precocious and mature child, much "smarter" at her lessons than the other children, with whom she was disinclined to romp and play, preferring the company of adults. She behaved like a prim little old lady—resembling a doll, with the gestures, ways and expressions of a grown-up. During her periods of cephalgia she was apt to be irrational with vivid auditory and visual hallucinations.

Examination showed a chubby child, 44 inches in height (6 inches below the normal for her age), and weighing only 42 pounds (a loss of 20 pounds in three years).

A radiogram clearly showed a nodular tumor (doubtless a teratoma) perched above a sella turcica of normal outline. Epiphysial ossification and second dentition were backward. There was a low grade of choked disc but the visual fields were normal.

On *August 9, 1912*, a futile attempt to expose the tumor by a subtemporal operation was abandoned as a simple decompression after the ventricle was punctured, revealing a hydrocephalus. The decompression served to relieve her general pressure symptoms, but before her discharge the perimeter disclosed a relative scotoma of both upper temporal quadrants—the earliest stage of the bitemporal hemianopsia characteristic of a chiasmal lesion.

She returned two months later owing to a return of pressure symptoms; she was disoriented and had active hallucinations, followed after some days by a series of convulsions, Cheyne-Stokes respiration and unconsciousness, due presumably to an acute obstructive ventricular hydrops. A callosal puncture was attempted, but as might have been surmised no fluid was encountered in the third ventricle and recourse was had to drainage of the lateral ventricles under the scalp.

This temporizing measure has proved more effective than usual in relieving, up to the present time (6 months later), the pressure complications of the hydrocephalus.

This is a typical example of hypopituitarism accompanying a congenital tumor (the syndrome of Fröhlich) with the combination of an unusual mental maturity and an infantile physique. The story moreover illustrates one of the not uncommon secondary complications of these cases.

The following is another example of early hypopituitarism, also interesting from the standpoint of mental precocity.

A young man, 23 years of age, was referred to the Brigham Hospital in March, 1913, owing to threatened blindness from a primary optic atrophy. One of a large family of children of average stature and intellect, he was always regarded as exceptional, not only because of an unusual mental alertness but also from his peculiar avoidance of youthful companions, especially those of the opposite sex.

He went through school and entered a medical college, where he graduated at the age of 21 with the highest honors they had ever given, though so nearly blind during his last two years that a professional reader was required. He has not experienced any especial drowsiness.

Physically he is an undersized, moderately adipose, beardless and boyish looking individual, with the extreme physical *typus femininus* characteristic of these states in the male when they antedate puberty and are associated with the imperfect acquirement of the secondary characters of sex.

Though free from discomforts other than an occasional mild headache, the neighborhood signs were nevertheless pronounced, the x-ray disclosing obliterated sellar outlines, the ophthalmoscope a primary optic atrophy, and the perimeter a clean temporal hemianopsia with loss of macular vision in the one eye in which there was some retained sight.

At operation a large portion of the usual soft hypophysial struma was removed. This was followed by rapid (4 days) and almost complete restoration to normal of the visual field in the previously hemianoptic eye, with re-establishment of reading vision.

This example illustrates further that the personal oddities accompanying these disorders are not incompatible with an intellectual activity equal to or possibly exceeding the average.

Another patient in my series, of a similar physical type, had been an instructor in English in one of the leading colleges. He had never fully acquired his secondary characters of sex, and had a typical feminine type of skeleton with corresponding fat deposition. He was unmarried. Though a good student and a clever writer he had always been regarded as having a somewhat bizarre personality, but pronounced mental deterioration did not appear until his third decade, coincident with an invasion of the intracranial chamber by the growth. Still another patient who has been under observation for two years with an inoperable pituitary adenoma, had been a successful physician until at the age of 38 he began to lose his vision and to show signs of forgetfulness and drowsiness. He has since become blind and his present psychic state is well expressed by the following quotation from a recent letter sent by his observant wife.

"He continues mentally confused and disoriented; he sleeps most of the time and while asleep has incontinence of urine. The quality of the pulse is good but ranges from 60 to 70 and the temperature a little below normal. His strength keeps up remarkably well, but he becomes easily fatigued mentally and physically, and there is a listlessness of the whole body. I notice some tremor but this is not particularly marked. He occasionally has a dual consciousness of things; for instance this morning he declared most positively that there were two Miss Smiths (his nurse); and he has many queer delusions about being unable to walk or eat. He will often say, 'You know I can't get up because of my back,' or 'I haven't been up for weeks on account of my broken legs,' or again, 'Just how many weeks has it been since I have eaten anything?' One day he absolutely refused to take his tub bath, because he thought he was in Heaven and had given his word to someone here below that he would not, and no amount of persuasion could change his belief. Though blind he has mental vision, for he constantly mentions things that he 'sees' in the room, and of course they do not exist for us. He never expresses a wish or desire for anything, and is contented and docile and like a big, dull child. He always knows me but is often confused as to our little girl's parentage, and practically never knows where he is."

As a rule the dispositional changes in these individuals are not associated with any of the fretfulness, irritability, restlessness or distractibility which often characterize the secretory hyperplasias. They are, as Frankl-Hochwart has also pointed out, almost invariably contented, amiable and co-operative patients, often exhibiting an astonishing indifference to their malady. There would seem

to be merely a retardation of mental activity comparable to the lowered metabolism of the tissues in general.

This, however, may be only the general impression gained from the particular individuals—though they are now some 60 in number—who have been under my care, for through the kindness of Dr. Bond I have seen several patients at the Danvers Asylum who were unquestionably suffering from what we would regard as hypopituitarism but who nevertheless exhibited a restless activity, with hallucinations, distractibility and so on—as was true of the individual whose case was the occasion of the episode recounted at the outset of this paper.

The following history of one of my patients is remarkable, in many respects, in showing the effect of glandular administration in these lethargic states which accompany glandular insufficiency.

A business man, 48 years of age, entered The Johns Hopkins Hospital *November 23, 1911*, with the following symptoms notable in his complaint—constant headache, great drowsiness, restricted vision, fainting spells, loss of *potentio sexualis*, great sensitiveness to cold, and polyuria.

The record of his family was remarkable merely from the standpoint of stature—many of them exceeding 6 feet in height. His father was 6 feet tall and weighed over 200 pounds.

There was nothing noteworthy about the patient's childhood and youth, though he had not been particularly rugged. He was never adipose. He married at 30, and became the father of four healthy children.

In 1905, six years before his admission, he received a severe blow in the face, which fractured his nose, and more or less constant headache and a noticeable loss of nervous energy dated from that time. He had previously been subject to occasional headaches. These symptoms progressed, and in 1907 a diagnosis of *diabetes insipidus* was made. In 1909 his vision began to fail, there was occasional diplopia, and a bitemporal hemianopsia was observed. At this time he had what was called a nervous breakdown. Osteopathy and a vigorous antiluetic régime were tried without avail.

Drowsiness, first noticed a year before his admission, had become the leading symptom. He grew utterly forgetful, was often completely disoriented, and there occurred a marked change in disposition, which is thus described: "Always very genial, sensitive and kindly, these characteristics have become exaggerated and he cannot bear the mention of sad or disagreeable topics—even such trifles as the killing of an insect offend him. He appears disinterested, without initiative, and often more or less irresponsible. He is utterly oblivious to his own illness and to the state of his business and financial affairs, as well as to the trials and ailments of his wife, for whom he was formerly very solicitous. For four or five years there has been a lowering of libido, followed by a complete loss of *potentio sexualis*, and with

this change he has become overly modest. There has been no tendency toward carelessness or untidiness in dress or habits. Loss of memory has been progressive, and latterly he has not been able to recall the names of familiar persons, engagements, business affairs, etc."

Periods of polyuria and polydipsia had possibly justified the suspicion of diabetes insipidus, the urine having often amounted to 4 liters per diem.

There had been three or four peculiar "fainting spells" lasting from five minutes to half an hour, with sudden loss of consciousness but unattended by convulsions or preceded by a gustatory aura. He complained of being chilly even on the warmest days when others suffered from the heat. The skin was exceedingly dry, the hands and feet always cold to the touch. The temperature was persistently subnormal. There was extreme muscular enfeeblement.

Through all this period occasional waves of deep somnolence occurred—so deep, indeed, and with such slowing of breathing that on two occasions recourse was had to artificial respiration.

The physical examination, briefly, showed a fair-complexioned, spare man, 5 ft. 9 in. in height, weighing 138 pounds, with thin hair and scant beard and dry, parched skin. He was dull, apathetic and drowsy and unable to follow a consecutive train of thought. His speech was slow, drawling and incoherent. Temperature 96, pulse 60. He was much disoriented both for time and place. The x-ray showed a normal sella. There was bitemporal hemianopsia with primary optic atrophy, which had progressed to near-blindness in the left eye. The Wassermann reaction was negative.

On November 30, a week after his admission, he passed into a profoundly lethargic state, with a blood pressure below 100, a subnormal temperature of 96.5, slow pulse and feeble, shallow respiration of Cheyne-Stokes type, attended by considerable cyanosis. There were involuntaries.

Without an anæsthetic a subtemporal decompression was performed, under the misapprehension that the symptoms were manifestations of pressure. No increase of intracranial tension was disclosed.

His condition remained unmodified and two days later he was given a subcutaneous injection of pituitary (anterior lobe) extract. This was followed by a characteristic thermic reaction to 101° F. Four hours after the injection he roused from his lethargy, seemed fairly rational and asked for nourishment.

This was the turning point in his critical condition. The detailed history of the following months and the struggle to supply the sufficient and proper dosage of the glandular extract need not be gone into.

On December 15 a transphenoidal operation with sellar decompression was performed, in the hope that the compressed gland might thus be relieved; and for some weeks there was a most unexpected betterment in his condition, both physical and mental, so that he was up, dressing and caring for himself, and taking exercise independently. During the succeeding month he remained for the most part perfectly rational and physically active. This was followed by an occasional period of somnolence, and finally he lapsed into his former lethargy, with disorientation, hallucinations and involuntaries.

as before. The feeding of glandular extract in large doses proved unavailing, and recourse was again had to intramuscular injections. Under these injections, given daily, he invariably improved, but their frequent repetition caused so much muscular soreness that they had to be discontinued.

On *February 9, 1912*, under primary anaesthesia the pituitary gland of a stillborn child was implanted in the subcortex, at the seat of the decompression, and glandular administration was discontinued. There was an unexpected and astonishing improvement in his mental condition, and Dr. Meyer's analysis at this time showed practically no deviation from the normal. His memory of past events was good and he had a peculiar subconscious recollection of certain hallucinations concerning his presence among relatives who were dead, and so on, which had disturbed him during his preceding months of somnolence.

He gained rapidly in strength, and was discharged, on *March 10, 1912*, apparently well, despite a tendency to nap in the afternoon, a continuance of polyuria, and unaltered neighborhood symptoms so far as the hemianopsia was concerned. He had been kept under observation during the full month in the expectation that the implanted gland might not actually have "taken."

On his departure he took a ten-hour trip to his former home, accompanied by his wife. He attended to all the details of buying tickets, hotel registration, payment of bills and so on, met his many friends, remembered and kept appointments with promptitude, and went about independently—indeed, from a psychic standpoint seemed an absolutely normal individual, "like his old self."

A return of his drowsiness then began to be apparent, with some forgetfulness and confusion, a lowering of temperature (96-97°) and a definite increase in the polyuria—from 6 to 12 liters in the 24 hours. He was brought back to the hospital on *March 21*, as somnolent, expressionless, disoriented, and anamnesic as on his former admission. When aroused he merely mumbled an incoherent reply to questions.

Four days later the gland of another stillborn infant was implanted in the subcortex and intramuscular injections were resumed. In the course of the next ten days he seemed again to reawaken, and largely regained his orientation, though his memory for events, when closely tested, was very defective. There were similar ups and downs for the next week or so, but for the most part he remained in a lethargic state, from which he could not be aroused even by vigorous shaking. There was marked insensitivity to pain—and another striking feature lay in the peculiar, coarse, irregular muscular twitchings, similar to those with which we had become familiar in dogs in a state of experimental cachexia hypophyseopriva.

He died on *April 30*, with a terminal inhalation pneumonia.

The autopsy disclosed a characteristic infundibular cyst about the size of a golf ball, from whose thick wall projected many warty outgrowths of squamous (pharyngeal) epithelium. The brain itself and the meninges appeared perfectly normal. At the seat of the primary implantation was a small cyst the size of a pea, no trace whatever of the implanted gland showing on serial sections. The second implantation was necrotic. The pituitary

body itself was much distorted from compression and contained no cells with acidophilic granules.

The temptation is great to record at even greater length some of the notes from this individual's voluminous history, particularly those relating to his mental status made on a few occasions by Dr. Meyer, before whose examinations we had labored under the impression that we were dealing with a case of dementia paralytica complicating a retrochiasmal tumor, presumably of hypophysial origin. As it is, however, the essentials have possibly been given, and for our present purposes the matter of chief moment concerns the somnolence, the insensitivity and the psychic deviations associated with the extreme pituitary incompetence.

If our assumption is correct\* that certain of the secretions of the gland pass directly into the cerebrospinal fluid it is possible that under circumstances such as those recounted an element essential to cortical activity may be lacking from the fluid which bathes the brain. This is, of course, purely hypothetical.

I have ventured elsewhere to liken these somnolent states of hypopituitarism observed under both experimental and clinical conditions and characterized by a subnormal temperature, slow pulse and respiration, storage of fat and so on, to the phenomenon of hibernation; and some clinical examples have been given in the monograph to which I have referred. Moreover, this comparison of hypopituitarism and hibernation is not merely figurative, for the histological examination of the glands in a series of hibernating woodchucks kindly supplied to us by Prof. Sutherland Simpson shows that during the period of seasonal sleep the anterior lobe cells are small, undifferentiated and uniformly free from the granules and varied staining reactions which indicate stages of secretory activity. On this same basis, furthermore, we may justly ascribe the drowsiness which accompanies a variety of intracranial disorders to an hypophysial secretory deficiency rather than to the stimulation of an hypothetical center for sleep, supposed by some to exist in the tuber cinereum.

In the patient whose story has just been related an hypophysial insufficiency was associated with profound psychoses, and allusion

\* Cushing and Goetsch: Concerning the secretion of the infundibular lobe of the pituitary body and its presence in the cerebrospinal fluid. Amer. Jour. Physiol., 1910, xxvii, 60.

has been made earlier in this paper to states of insanity accompanying the reverse condition, namely hyperpituitarism. One meets not rarely in the present-day literature of mental disease with the description of disorders classified as dementia *præcox*, not only in patients with evident acromegaly but also in association with what would seem to be adiposogenital dystrophy. The possibility of some internal secretory derangement as an exciting cause in at least some of the cases now grouped as dementia *præcox* has, of course, occurred to many, and still fresh in mind are the operations on the thyroid which a few years ago were advocated and practised as a therapeutic measure in certain forms of this multiform disorder.

Dercum and Ellis<sup>19</sup> have recently made a histological examination of the ductless glands in eight cases of dementia *præcox*, but aside from the fact that all of the patients showed tuberculosis—a finding which they are inclined to connect with some adrenal insufficiency—there were no histological changes of note. Indeed, when it comes to the examination of these structures, especially in the case of a dualistic gland so greatly modified by varying conditions, physiological and pathological, as is the hypophysis, it becomes almost impossible to say what is and what is not a condition of disease. Particularly is this true of glands which have been fixed in divers ways at variable periods after death and then cut haphazard in various directions. This was strikingly brought to my attention a few years ago by the examination of a series of some 75 pituitary glands sent to us from Worcester through the kindness of Dr. Meyer. There appeared to be no examples among them of what might be called histologically normal glands, though certainly many of them must have been normal within physiological limits. Unquestionably we may expect more in the future in so far as the ductless glands are concerned, from the investigation of an individual's pathological serology than is now possible through the microscopical examination of the tissue cells, even with refined methods of staining the secretory granules.

There are two other subjects on which for a moment I shall dwell. One concerns the transmissibility of an internal secretory derangement, the other certain observations concerning the

<sup>19</sup> Dercum and Ellis: An examination of the ductless glands in eight cases of dementia *præcox*. *Jour. Nerv. and Ment. Dis.*, 1913, xl, 73.

secondary effect of pituitary and pineal activity upon the sexual sphere—a matter which has some bearing upon the recent Freudian doctrines.

Not only may a parent's physical characteristics, affecting such elements as stature, color and so on, be transmissible, but in families in which an unusually large or small stature seems to be dominant it would appear that pathological deviations toward acromegaly or the reverse are more apt to occur. Examples of this are given in my monograph. There seems to be little doubt too but that peculiarities which affect the chemistry of the tissues are equally capable of being inherited, as exemplified by familial diabetes, alkapturia, cystinuria and so on.

Some of these conditions are due, in all probability, to inherited disorders of internal secretion, and it is of interest that Halsted observed histological changes in the thyroid glands of the litter of a partially thyroidectomized dog. In the histories of a number of the patients in my hypophysial series diabetes or other evidence of a parental disturbance of tissue metabolism has been recorded, possibly more often in the history of the maternal parent; and even more noteworthy in our present connection is the fact that familial mental derangements are far from uncommon. To be sure, when there is any considerable lowering of hypophysial activity, reproduction becomes impossible owing to the occurrence of amenorrhoea in the female or of impotence in the male. In the early stages of hyperpituitarism, however, there may be a period marked by an especial libido—of which many of the victims of the disease have been aware.

An example of hypopituitarism, associated with a large hypophysial "goitre" occurring in a young man with a family history of insanity, is as follows.

Mr. E., 36 years of age, first came under observation two years ago, with the complaint of impotence and epilepsy.

His father was for a long time in an institution, with the diagnosis of dementia, but was ultimately discharged. He died at the age of 69 of paralysis agitans. An uncle committed suicide in a fit of depression. A cousin is at present in an asylum, with the diagnosis of depressive manic insanity.

He has three brothers, two of whom are twins. They are all stout and have scant hirsuties, as is true of the patient himself. Many of the members of collateral branches of the family are adipose; the grandmother weighs 300 pounds.

He had an attack of diphtheria at 12 and a severe typhoid at 19 years of age. Soon after his graduation from college he assumed charge of his father's business affairs, which were involved and which entailed considerable responsibility and worry. He married in 1900, and soon afterwards became anaphrodisic and impotent. Epileptiform seizures of an uncinate character with a prolonged gustatory aura have recurred since 1909. These attacks have been associated with a marked confusional state and lapses of memory, often lasting for some days at a time.

The physical examination shows a typical example of hypopituitarism with scant hirsuties, adiposity and physical typus femininus. Weight 220 pounds. The x-ray shows a greatly enlarged sella with absorption of the dorsum. When first observed there were no perimetric or ophthalmoscopic changes, though in the course of the subsequent two years these have become apparent as an increasing pallor of the discs and an homonymous defect for form and colors in the left upper quadrants. A subnormal temperature, dry skin, drowsiness and high sugar tolerance have been noted for some years.

Though the gustatory seizures make it evident that the growth has extended out of the pituitary fossa into the cranial chamber, where it presses against the uncinate gyri, there have been, however, no headaches or other signs of pressure.

A transphenoidal operation was performed on November 9, 1911, with partial removal of the intrasellar portion of the large, soft struma. Glandular therapy was instituted, and for some months he appeared in better physical and mental condition. The uncinate seizures, however, have continued unmodified.

All his life the patient has been of rather a gloomy disposition, with recurring fits of despondency, in which he becomes lachrymose on slight provocation. These characteristics have become more pronounced of late. He is very forgetful, drowsy, and often is so depressed that he threatens to make away with himself, believing that he has inherited some mental instability which makes life not worth the struggle. He latterly has ceased to take any interest in his former avocations and amusements, and he has even become uncertain as to the names and uses of the tools in his favorite home workshop.

Another example of transmitted glandular derangement associated with insanity occurred in the case of the acromegalic woman heretofore referred to as suffering supposedly from manic-depressive symptoms, and attention may be drawn to the fact, which the foregoing history also emphasizes, that mental disturbances of a depressive type are particularly characteristic of pituitary disorders.

Her father died in an asylum with some unknown form of insanity. Her mother, who was 43 at the time of the patient's birth, showed definite traces of acromegaly but lived to be 75. The patient herself, one of seven children, most of whom died in early life, had suffered since childhood from what

she called periods of depression. These she had concealed from others, even from her husband.

As a child she was devotedly attached to and idolized an elder sister, on whom she became so abnormally dependent for action and speech that only with the greatest anguish was she weaned from her when a school separation became necessary. She attended a grammer school, stood well in her studies and graduated at the head of her class.

During this entire time, so far as she can recall, she was secretly unhappy and suffered from a feeling of unreality. She could not look at herself in a mirror, owing to an unnatural sensation, and often considered herself without personality and in a dream. She feared to be alone, for when not actively occupied waves of depression and melancholy would sweep over her. She, however, was too diffident to take part in her classmates' entertainments. She never spoke to anyone of her peculiar feelings.

She taught school the year after her graduation, and did well in spite of her periods of despondency and the recurring sensation of unreality—best described as a feeling that she was automatic and without personality. Her attempts to keep at her work for another year sadly failed owing to periods of depression lasting for some months at a time. It is not clear whether or not these were associated with sexual matters.

In 1898, when 25 years of age, she married a physician, and thinks that the duties and activities of married life, and caring for her household and children, served to lessen her fits of depression for the time-being.

When she was 31, with acromegalic manifestations already apparent, her third daughter was born. This child was overlarge at birth; was exceedingly adipose during the first year of life; first menstruated when two years of age and with regularity since the inaugural period with a single interruption (at *circa* her fifth year) for a few months. At the age of six all her secondary characters of sex had appeared.

When examined at the time of her mother's admission to the hospital she was eight years of age and had the appearance of a child of 14. Though seemingly intelligent she was said to be shy and highly nervous. Her height was 57 inches (normal for her age 48 inches); weight 85 pounds (normal for her age 52.9 pounds).

To return to the mother: not until a few weeks before her admission did her husband, a busy country practitioner, begin to realize her condition through confession of a fit of despondency in which she threatened suicide. When brought to the hospital she was profoundly melancholic, and said among other things: "Life is nothing but insanity or suicide. All my people die on Saturday: there seems to be some fate about it."

She had a large pituitary struma, which was partially removed by a transphenoidal operation. There were no surgical complications and for a time after returning home she appeared better and more cheerful, and was less carefully watched than formerly. Not long after this, on a *Saturday*, she jumped from the second story window of her home and broke her neck in the fall.

The remarkable sexual precocity exhibited by this unfortunate woman's third child, born after her own acromegaly had become outspoken, brings up the question of *Frühreife* in general and its relation to ductless gland disorders. The close interrelation of hypophysial and gonadal activity has become a matter of general appreciation, and it would appear to be a subject which deserves the close attention of the psycho-analysts of the Freudian school.

The pituitary body and the germinal glands appear to be protagonists. Hypophysial insufficiency and a lowering of the activity of the reproductive functions go hand in hand, and in some of our examples of hypoplasia, glandular feeding has unquestionably led to a restoration of potentio. The reverse is probably also true, for, as stated, a libidinous tendency often accompanies states of secretory hyperplasia, and certain experiments undertaken with Dr. Emil Goetsch have indicated that feeding pituitary extracts to pre-adolescent animals leads to a precocious ovulation and spermatogenesis. These observations, coupled with the knowledge that secretory discharges from the hypophysis may be elicited through the sympathetic nervous system, suggest that the liberation of a chemical messenger may account for the recognized effect of the emotions upon the sexual sphere.

Possibly the most notable instances, however, of *Frühreife* occur in conjunction with pineal lesions, and a number of typical cases have been recognized by others since the appearance of Marburg's and Frankl-Hochwart's papers on the subject. As yet it is not clear whether these extraordinary conditions of precocious adolescence accompanied by a tumor of the pineal gland are due to an excess or to a diminution of the secretory activity of the gland, though the latter would seem to be the more probable not only in view of Foa's suggestive experiments but also for the reason that the gland undergoes early retrogressive changes at or before the occurrence of a normal adolescence.

Two characteristic examples of precocious adolescence associated with a pineal lesion have been under my observation. Both were boys, seven and eight years of age respectively, in one of whom the secondary characters of sex, with marked skeletal overgrowth, had appeared at the age of six, in the other at the age of three years. One of them had a complicating hydrocephalus and had become very adipose, due, I presume, to a secondary effect

upon the hypophysis, and at the time of the operation for this condition a portion of the testis, removed for histological examination, showed an unusual preponderance of interstitial cells but no spermatogenesis. Both of these uncanny children exhibited extreme mental deviations with lax inhibition, which might easily have led them into punishable acts.

It is plain that the two intracranial glands, hypophysis and epiphysis, normally exercise a remarkable influence not only upon nutrition and skeletal growth but also upon the sexual sphere, and it is not a matter for surprise that in the presence of a definite pathological derangement of either of these structures which dates from childhood, mentality should be so modified as to produce peculiar if not defective individuals when measured by the standard of the average.

With this conception we may find some physiological or pathological basis for what is regarded by many as a psychotherapeutic phantasy; for the various neuroses and asthenias may arise primarily as the result of some disturbance of internal secretion which paves the way for the dreams, symbolisms, neurograms and other acrostichal manifestations dissected by the psycho-analyst. If therefore we are to swallow the Freudian doctrines whole—a difficult morsel for many—and are to interpret hysteria and the psychoneuroses solely as the resultant of early mental conflicts and compromises between the libido and its repressions it will be easily seen that any secretory deviation which on the one hand excites, or on the other diminishes, sexual activities must be an important element in modifying the terms affecting the ultimate compromise.

We have of course been considering extreme examples, but it is quite probable that the psychopathology of everyday life hinges largely upon the effect of ductless gland discharge upon the nervous system. This is particularly worthy of consideration in the study of child psychology in its relation to puberty and adolescence, especially in those individuals in whom there is some underlying, possibly inherited, functional deviation in the chemistry of the internal secretion. At any age, however, in the presence of some ductless gland irregularity psychic shocks, which in, chemically speaking, more stable individuals would be transient, may produce secretory disturbances, characterized by more or less chronicity.

In psychopathic clinics and in asylums examples of the psychoneuroses associated with possible derangements of internal secretion will doubtless come to be more closely scrutinized, however large or small the group may prove to be, and it is safe to assume that a certain proportion of the feeble-minded or actually insane—the group of cases in which post-mortem examination reveals no apparent cerebral lesion—are at least worthy of investigation from this same standpoint, with possible emphasis on the two intracranial glands. Patients with outspoken physical signs of a pineal disorder, of acromegaly, gigantism or adiposogenital dystrophy, are doubtless comparatively rare among asylum inmates, though many isolated symptoms associated with these states—as adiposity, glycosuria, hypertrichosis, somnolence and so on—are common enough to point out the cases worthy of study, however great may be our present difficulty in determining which was the primary factor—the psychic instability or the disturbance of internal secretion.<sup>11</sup>

<sup>11</sup> It is to be hoped that some serological test, possibly in the direction of Abderhalden's investigations on the serodiagnosis of pregnancy, will serve to give us a chemical reaction of diagnostic value at least for states of overactivity of individual glands. Some glimmerings that these dialyzation tests may be of diagnostic aid in psychiatry are suggested by Fauser's reports (*Weitere Untersuchungen auf Grund der Abderhaldenschen Dialysierverfahrens. Deutsch. med. Wchnschr.*, 1913, xxxix, 304), and we possibly may come to attach an importance to the findings of pathological serology far greater than that which in the past we have given to the cytological changes shown by the microscope.

## PRIMITIVE MECHANISMS OF INDIVIDUAL ADJUSTMENT.\*

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Sometimes in attempting to describe the various levels at which human activities express themselves we make use of terms which carry with them the implication that these phenomena occur in separate and distinct planes. The planes or levels are described as if they were superimposed one upon the other, and attention is forcibly directed to fictitious, "specific characteristics," thus placing too great emphasis on contrasts and failing to direct attention to the consideration of processes as functional units.

A number of factors have tended to emphasize a purely artificial division. A decade or more ago the exigencies of the clinic and the practical necessity for carrying out a division between neurology and psychiatry had a most unfortunate effect in emphasizing the antithetical phases in the types of reaction studied by the neurologist and alienist. There were psychologists also who resisted the intrusion of the uninitiated into a territory which had been fenced off from the domains of the biologists, and they insisted on the preservation of arbitrary distinctions. A comparatively new and intense interest in the important subject of psychoanalysis has also unfortunately thrown into relief superficial contrasts existing between the different levels of activities without sufficient consideration having been given to the dependence of levels upon each other.

Unless we are extremely careful in studying the responses of the human individual the antitheses or contrasts between the different planes are much more apt to engage attention than are the links by which the various mechanisms are held together, and expressed in the form of individual reactions. We have all been so eager to take apart and examine the different portions of the

\* Address delivered at the opening exercises of the Henry Phipps Psychiatric Clinic, The Johns Hopkins Hospital, Baltimore, Md., April 16-18, 1913.

mechanism that we have entirely forgotten to describe the manner in which the organism as a whole operates.

In attempting to describe the phenomena of response of living organisms in the higher levels of activity we have been forced to employ terms applicable only to the description of simpler mechanisms, and a defective phraseology has served to bring into sharp relief an apparent, but not a real, distinction between the various phenomena. Some of us have also been guilty of selecting terms which were dictated by an unfortunate desire to establish a complete philosophical system.

Not only the old terms need to be revised, but even such a recent and extremely useful addition to our vocabulary as "integration" should be carefully defined. The very fact that such a term is often used to indicate a synthesis of hypothetical psychical elements into single or more complex states may, unless we are on the alert, commit us by mere usage either to a belief in our capacity to recognize and define the mental elements, or will shunt us along lines of investigation which temporarily do not offer the possibilities for extending our knowledge as promising as those to be attained by starting out from another point of departure. Whether the higher levels of activity are capable of being ultimately resolved into the long sought-for elements of sensation does not seem to me at this time to be a matter of any considerable moment in attacking the problems relating to individual behavior. An integration of hypothetical elements can never be experienced by us; and, as practical students of human behavior, interested only in phenomena which fall within the field of experiment, the question may for the present be dismissed. In studying the primitive mechanisms of individual adjustment the responses of the organism to stimulation may be more advantageously treated as units than by attempting to resolve them by means of our present crude methods into elements. We cannot hope to accomplish a complete resolution until we have obtained a far more comprehensive knowledge of the fundamental properties of the living organisms than we yet possess.

Let us not forget that in the study of individual reactions the direction of our thought processes is influenced by a centripetalizing tendency toward a vortex within which "the self" is located; and thus we often tend to place too much emphasis upon those

phenomena occurring within our own body while neglecting the equally important factor in each reaction of environment. This trend in our method of analysis has been responsible to a large degree for the comparison generally adopted of the reactions of an individual to the working of a machine generating its own energy and operating more or less independently of the environment. The comparison with this special type of machine undoubtedly was made in order to supply us with what was supposed to be a complete satisfactory hypothesis to explain the phenomena of response, expressing them in a crude, mechanistic phraseology. If it were not for this unfortunate tendency to seek for ultimate truths the path of the investigator would be an easier one.

If it is necessary to illustrate by analogy our conceptions of the nature of adjustments, we may promptly dispense with the type of machine once employed and substitute for it that of a balance. This change in our angle of vision will give us a new point of advantage in attacking the problems under discussion. Semon has recently indicated the theoretical as well as the practical importance of considering all of the links in the chain of phenomena which are commonly described under the head of irritability. He has defined a stimulus as a change taking place in the entire energetic situation, or, in other words, a disturbance in the balance of forces. As soon as we approach the study of our problems from this standpoint we are enabled to observe the general similarity of nervous reactions with the more fundamental phenomena which may be considered to be general properties of living matter. Although Jennings and other investigators have repeatedly insisted upon the fact that the existence of a nervous system did not predicate the presence of specific functions, in the discussion of these particular problems the truth of this affirmation should be strongly emphasized.

The unit character of reactions is not limited to those determined by the nervous system. If the protein balance in the organism is disturbed by means of an injection of salt solution, Vaughn and other investigators have shown that fever may be the result; or, if the general equilibrium of an individual is disturbed by a blow, a series of reflex or automatic movements may follow. In either case had the balance been maintained there would obviously have been no reaction. In both instances the response of the organism

may be considered as a unit, and it is not necessary for us in order to establish a causal relationship between stimulus and reaction that we should at once be capable of resolving the underlying phenomena into their elements. As practical students of behavior, that which interests us in both instances is the general character of the results of the experiments.

A general idea of the character of the primitive mechanisms, forming the basis of all individual adjustments, is exemplified by the responses occurring in the early life of the vertebrate embryo. Here one may study to great advantage the first movements, either of heart or body, noting the occurrence of a definite rhythm at a period antedating the appearance of a differentiated nervous system. Rhythmic movements do not in any sense predicate the existence of a special mechanism of adjustment. Of all the influences which modify these primitive movements, heat is undoubtedly one of the most potent factors. The fact should not be overlooked that changes in function following variations in temperature are the result of chemical reactions. The modifications and responses of the organism during the early periods of its life seem to be far more readily induced by a change in temperature than by the introduction even of moderate doses of toxic substances into the surrounding media. This question we have discussed at a greater length in another paper (Proc. Amer. Philosoph. Soc., 1913). At a period when adjustments to temperature have become very delicate, those for mechanical stimuli do not exist. At a still later stage, when the peripheral nervous system is differentiated, a finer discriminating response for chemical stimuli becomes apparent. At this same period cocaine and other drugs of this class first become effective as local anæsthetics, but not until the sympathetic nervous system begins to function does the organism acquire the capacity to discriminate between the action of many drugs. (J. Comp. Neurol., Vol. 21, No. 4, 1911.)

It is not my intention to discuss the details of experiments, but simply to refer to a few observations in order to show how impossible it is in analyzing, even the so-called lower levels of activity, to attribute any increase in the complexity of function to the introduction of specific elements. I have already called attention to the importance of exercising caution in the choice of phraseology so as to avoid conveying an impression that barriers exist which

sharply divide one level of activity from another. The act of taking over the control of primitive adjustments by the nervous system does not introduce any specific elements. As we pass from the study of the primitive adjustments, such as the rhythmical movements of heart or body, to automatic, and even volitional acts, let us remember that the levels at which we pause to study the phenomena are arbitrarily marked out in order to suit our convenience, but do not indicate the existence of actual divisions. When we study very carefully the relation of the first movements of the embryo to the correlative changes in the nervous and muscular systems, although it is possible to observe a certain elaboration of function, we cannot detect any evidence of the creation of new ones. When, for example, the sensory tract in the cord is differentiated a path is opened by which the embryo is brought into more intimate connection with changes taking place in the environment, but we are not able by any present method of analysis to detect the entrance of a new and specific factor into our problem.

For some time I have been impressed with the practical necessity of studying all reactions of the embryo as biological units. Herrick<sup>1</sup> in a very suggestive paper on the cerebral cortex has very clearly formulated the ideas which I had more or less vaguely entertained, but had not been able to express as clearly as he has done. This investigator following Dewey's lead shows the importance of considering unit reactions as a starting point for psychological analysis. If we cannot resolve even the primitive adjustments of the embryo into constituent elements, then the complexity of the processes expressing the functional activity of the adult cortex will surely baffle all attempts in this direction to state our problems in terms that are intelligible. Herrick has suggested that we should consider the reactions occurring at birth as units, but it seems to me that we may go even further back, beginning with still simpler forms—those taking place during the early life of the embryo, and ones into which fewer factors are introduced that will increase the difficulty of analysis. I have already indicated what seems to me to be the more important factors in these primitive adjustments of the organism: first, those

<sup>1</sup> Herrick, C. Judson: "Some Reflections on the Origin and Significance of the Cerebral Cortex." *J. Animal Behavior*, May-June, 1913, Vol. 3, No 2, pp. 222-236.

for heat; then, those for chemical sense which become more defined and are associated with greater discriminating capacity as the peripheral and sympathetic nervous systems develop. These mechanisms play an important rôle in all forms of adaptation. Adjustments in the so-called higher planes of activity always depend upon changes occurring in lower levels; and, as a matter of fact, the former are only possible as long as the latter continue. Adjustments in the will-level always predicate the existence of reflex and automatic activities, for without the occurrence of the latter life cannot exist. Adjustments taking place in isolated planes may be described in books, but never occur in living beings. If a reference to the level at which the hypothetical elements are to be introduced, in order to explain the synthesis of complex mental states, inevitably brings us face to face with formidable theoretical difficulties, may we not avoid a dilemma by a more direct method of investigation of individual reactions?

## DEMENZPROBLEME\*

VON PROFESSOR K. HEILBRONNER, UTRECHT, HOLLAND.

In den freundlichen Zeilen, mit denen ich zur Teilnahme an der heutigen imposanten Festlichkeit eingeladen wurde, war mir der Wunsch ausgedrückt, ich möchte als Gegenstand meines Vortrages ein Problem wählen, das einen Einblick in die Weiterentwicklung der *Wernicke'schen* Schule böte. Musste ich mir schon von vornherein zögernd die Frage vorlegen, ob es mir gelingen werde, Gedanken und Worte zu finden, würdig des Tages und der Stelle, da mir zu sprechen vergönnt ist—die Frage, ob es möglich wäre, die *specielle* Aufgabe in auch nur einigermassen befriedigender Weise zu lösen, musste mich noch viel ernstlicher beschäftigen. Der Grund dafür liegt—abgesehen von der Unzulänglichkeit des Einzelnen und der relativen Kürze der Zeit, für die ich Ihre Aufmerksamkeit in Auspruch nehmen darf, in der ganz besonderen Stellung, welche selbst die speziellen Wernicke'schen Schüler schon zu Lebzeiten Wernicke's dem Lehrer und seinen Lehren gegenüber eingenommen hatten, und die sich in der Entwicklung seiner Schule nach seinem Tode noch deutlicher widerspiegeln musste. Was *Wernicke* als Neurologe, speciell als Hirnpathologe—übrigens weit über sein speciellstes Forschungsgebiet, das der Aphasie, hinaus—geleistet hatte, hat zum grössten Teil so allgemeine Anerkennung gefunden, dass es schon der heutigen Generation—noch nicht 8 Jahre nach Wernicke's allzufrühem Tode—kaum mehr als Ergebnis seiner Forschung, geschweige denn als ein specieller Besitz der an ihn anschliessenden Schule erscheint, objectiv ja wohl eigentlich der grösste Erfolg und der schönste Lohn, den eine wissenschaftliche Tätigkeit finden kann.

Ganz anders liegen die Verhältnisse bezüglich der in engerem Sinne psychiatrischen Tätigkeit Wernicke's, die uns hier speciell zu beschäftigen hat: dass auf einem Gebiete, das unter so mannigfachen Gesichtspunkten der Durchforschung und Betrachtung zu-

\* Vortrag gehalten bei der Eröffnungsfeier der "Henry Phipps Psychiatric Clinic" in Johns Hopkins Hospital, Baltimore, Md., 18. April, 1913.

gänglich ist, nicht eine Betrachtungsweise über alle anderen ohne Weiteres den Sieg davon trug, erscheint verständlich und bedarf keiner weiteren Ausführung; wohl aber mag hier an eine andere Tatsache erinnert werden, auf die ich seinerzeit schon in dem Nachrufe auf Wernicke hinweisen musste, und die in den seitdem verflossenen Jahren noch deutlicher in's Licht getreten ist: auch von den engeren Schülern Wernicke's hatte keiner seine Psychiatrie in toto übernommen; was allen gemeinsam blieb, was auch jetzt noch bei allen sonstigen Verschiedenheiten die Zusammengehörigkeit der "Schule" erkennen lässt, das ist eine gewisse gemeinschaftliche Untersuchungs- und Betrachtungsweise. Es zeugt wohl für die Tiefe und Fruchtbarkeit dieser von Wernicke geschaffenen Betrachtungsweise, dass eine derartige Entwicklung erfolgen konnte, dass eine Wernicke'sche Schule erkennbar weiter bestehen und einen gewissen Einfluss auch über den engen Kreis hinaus entfalten konnte—trotzdem der *praktischen* Psychiatrie aus der Wernicke'schen Richtung zunächst wenig Gewinn zu winken schien und auch sonst ihr äusserer Erfolg manche Hoffnungen enttäuschen mochte. Es ergibt sich aus diesem Entwicklungsgang aber für die Wernicke'sche Psychiatrie noch mehr als für jede in Entwicklung begriffene und lebendig fortschreitende Wissenschaft, dass auch von den persönlichen Schülern Wernicke's wohl keiner sich das Recht anmassen dürfte, in jedem Sinne nur Wernicke'sche Ideen bewahrt oder weiter entwickelt zu haben.

Unter diesem Gesichtspunkte möchte ich Sie bitten, auch die nachfolgenden Erörterungen aufzufassen—als die Gedanken eines Psychiaters, der Wernicke zu einer Zeit als persönlicher Schüler und in bescheidenem Masse als Mitarbeiter nahestehen durfte, als der "Grundriss der Psychiatrie" entstand, als er selbst in seinen aufnahmefähigsten Jahren stand, und der zum Mindesten subjectiv die Empfindung und die Absicht hat, im Sinne seines Lehrers weiter zu arbeiten.

Viel weniger Bedenken erregte mir, wenn ich schon dem ehrenvollen Auftrage folgeleisten zu dürfen glaubte, die Wahl eines Themas, das, wie in der Einladung weiter zu lesen war, "im Centrum meines heutigen Interesses stände." Nicht nur heute, sondern eigentlich wohl von Beginn meiner wissenschaftlichen Tätigkeit an, schien mir das Problem der Demenz eines der wichtigsten und bedeutungsvollsten in der ganzen Psychiatrie; es erschien mir als

Thema der heutigen Besprechung um so geigneter, weil kaum ein anderes durch Wernicke so reiche Anregung und Förderung erfahren hat, wie das der Defectzustände im weitesten Sinne, weil vielleicht an keinem anderen die Wernicke'sche Auffassung psychischer Störungen gleich deutlich und fruchtbar in Erscheinung tritt.

Dass die kurze Spanne eines Festvortrages nicht hinreicht, das Thema auch nur einigermassen erschöpfend zu behandeln, bedarf wohl keiner Betonung; dass die kurze Uebersicht nicht zu vielen abschliessenden Resultaten führen wird, wird niemanden in Erstaunen setzen, der sich auch nur einigermassen der Schwierigkeit der zu lösenden Fragen bewusst ist, und der sich erinnert, welche unendliche Mengen mehr oder weniger wertvoller litterarischer Beiträge zur Lösung der uralten Probleme von psychiatrischer und neuerdings auch von psychologischer und paedagogischer Seite beigebracht wurden.

Gerade in der Stunde der feierlichen Eröffnung einer Anstalt, die mit in erster Linie berufen sein soll, der Wissenschaft und Forschung zu dienen, scheint es mir aber erlaubt, unsere Gedanken nicht vorwiegend nach den gesicherten *Ergebnissen* früherer Tätigkeit zu richten, sondern dahin, wo sich die *Probleme* zu neuer Tätigkeit vor uns auftürmen, und zu untersuchen, wie wir dieselben anzugreifen haben, und uns klar zu werden, wieweit dieselben nach dem heutigen Masse unserer Einsicht und vielleicht für immer als unserm Verständnis unzugänglich und unangreifbar betrachtet werden müssen.

Es kann hier natürlich nicht die Rede davon sein, irgend eine der *practischen* Fragen zu behandeln, die uns die Zustände von Schwachsinn nahelegen: etwa die Behandlung und Erziehung der Schwachsinnigen, die Scheidung der diesbezüglichen Competenzen zwischen Arzt und Paedagogen, die forense Beurteilung des Schwachsinns, die Massregeln gegen gefährliche Schwachsinnige, die Abgrenzung der forens überhaupt zu berücksichtigenden Grade des Schwachsinns; die nachfolgende Darstellung soll sich auf einige rein wissenschaftliche Fragen beschränken.

Dass diese *Scheidung zwischen wissenschaftlicher und praktischer Betrachtungsweise* gerade auf diesem Gebiete überhaupt gemacht wird, bedarf vielleicht einer gewissen Entschuldigung: das Endziel wäre natürlich, zu erreichen, dass beide Betrachtungs-

weisen zusammenfielen, und als Ideal hätte uns ein Zustand vorzuschweben, in dem die Wissenschaft auf jede Frage der Praxis eine Antwort zu geben imstande wäre, und das Mass der Zweckmässigkeit und Brauchbarkeit der getroffenen practischen Massregeln einfach in der Vollkommenheit ihrer Uebereinstimmung mit den Forderungen der Wissenschaft zu erblicken wäre. Die Praxis wird aber mit ihren Massregeln nicht warten können, bis die Wissenschaft alle für einen solchen Idealzustand nötigen Grundlagen geschaffen hat, gleichviel ob sie als individuelle Therapie von dem Hilfsbedürfnis der Erkrankten oder ihrer Angehörigen zum Eingreifen gedrängt wird, oder ob die öffentliche Ordnung von ihr allgemeine sociale Massregeln verlangt; sie wird eventuell genötigt sein, Compromisse zu acceptieren; sie wird unter Umständen selbst ein vorsichtiges Probieren nicht vermeiden können, während anderseits allerdings von ihr nicht verlangt werden sollte, dass sie *jede* neu auftretende, noch unbewiesene wissenschaftliche Lehre oder Hypothese unmittelbar zum Ausgangspunkte praktischer Massnahmen in grossem Style mache. Die wissenschaftliche Auffassung *darf* dagegen keine Compromisse kennen; sie wird widersprechende Ansichten nicht im Wege des Compromisses vereinigen, sondern durch Nachprüfung und Kritik so lange gegen einander abzuwägen haben, bis die eine die andere ganz oder teilweise überwunden hat; sie wird aber vor allem ihr Hauptaugenmerk nicht auf die erreichten Resultate zu richten haben, die sie der Praxis überlässt, um sie zu Gunsten der Allgemeinheit nutzbar zu machen: sie wird vielmehr das Erreichte nur als die Grundlage betrachten, von der aus sie neue Probleme oder alte Probleme mit neuen Mitteln in Angriff nimmt; man wird dieser verschiedenen Stellung von Wissenschaft und Praxis zu den Resultaten einerseits, zu den Problemen anderseits eingedenk bleiben müssen, um vor der Entmutigung bewahrt zu bleiben, zu der das Auftauchen immer neuer Probleme in der wissenschaftlichen Betrachtung sonst wohl führen könnte.

Dass auch die Beschäftigung mit dem Probleme der Demenz nicht ergebnislos gewesen ist, soll hier nicht näher ausgeführt werden; wir beschäftigen uns nur mit einigen Fragen, die noch der Lösung harren.

Allgemeine Uebereinstimmung besteht darüber, dass als die *Voraussetzung* für die Diagnose eines Demenz- Blödsinns- oder

Verblödungszustandes das Vorliegen einer psychischen *Minderleistung* anzusehen ist; über die Natur dieser Minderleistung wird alsbald zu sprechen sein; controvers aber ist seit sehr langer Zeit die Frage, ob als weitere Voraussetzung postuliert werden darf und soll, dass diese Minderleistung eine *dauernde und irreparable* sein müsse: unverkennbar besteht neuerdings eine zunehmende Neigung, die Frage zu bejahen; man wird dabei die classificatorische resp. terminologische Frage streng von der symptomatologischen zu trennen haben.

Es ist zweifellos berechtigt und entspricht einem Bedürfnis der Klinik, die stationären irreparablen Zustände von Minderleistung zu trennen von den vorübergehenden und reparablen; es ist ebenso zweifellos eine der Aufgaben der klinischen Psychiatrie für jeden Einzelfall nachgewiesener Minderleistung Anhaltspunkte für die Entscheidung zu finden, ob diese Minderleistung der gänzlichen oder teilweisen Restitution zugänglich sein wird; es ist auch durchaus unbedenklich und praktisch vielleicht sogar empfehlenswert, wenn man sich dahin einigt, die *Bezeichnung* Demenz für diejenigen Zustände zu reservieren, in denen ein der Restitution nicht mehr zugänglicher Zustand der Minderleistung sich entwickelt hat. Damit ist aber der Entscheidung der andern Frage nicht vorgegriffen, ob zwischen temporären und stationären Ausfallserscheinungen ein *principieller* Unterschied etwa in dem Sinne besteht, dass die ersten niemals in letztere übergehen könnten, dass jede Minderleistung unter allen Umständen von vornherein als restituierbar oder nicht restituierbar auftreten und eventuell auch zu erkennen sein müsste. Wir kennen allerdings Beispiele für beide Categorien: tausendfältige Erfahrung hat uns gelehrt, dass die Minderleistungen, zu denen die gewöhnliche melancholische Depression führt, niemals stationär werden; die Ueberzeugung, dass das gleiche auch für die Ausfallserscheinungen zutrifft, welche die klimakterischen Depressions- und Angstzustände mit sich bringen, wird im Gegensatz zu einer vor noch nicht allzu langer Zeit vertretenen Auffassung immer allgemeiner, und diese Ueberzeugung drückt sich darin aus, dass man die betreffenden Kranken nicht als dement bezeichnet und einen Uebergang in Demenz als nicht essentiell zum Verlaufe dieser Psychosen gehörig bezeichnet; wir kennen auch eine Reihe von Zuständen, in denen wir uns erfahrungsgemäss für berechtigt halten dürfen, nachweisbare Ausfalls-

erscheinungen als definitive und nicht mehr restituierbare anzusehen, wenn wir auch auf Grund von Erfahrungen, wie wir sie gerade bei den protrahierten klimakterischen Depressionszuständen gemacht haben, mit dieser Annahme immer vorsichtiger zu werden gelernt haben. Derartige Erfahrungen berechtigen aber immer noch nicht zu der Annahme eines grundsätzlichen Unterschieds zwischen temporären und dauernden Ausfallserscheinungen für *alle* Fälle; sie schliessen nicht aus, dass derselbe Vorgang, um einen möglichst wenig praejudicierenden Ausdruck zu gebrauchen, der einmal einen restituierbaren Ausfall verursacht hat, eventuell später bei demselben Individuum zu einer Dauerschädigung führen kann. Die Frage darf natürlich nicht mit der andern zusammen geworfen werden, ob etwa nach einem acuten Krankheitsprocess und nach dem Schwinden acuter Erscheinungen ein stationärer eventuell sogar progredienter Defectzustand verbleiben kann. Man wird für viele dieser Fälle mit Recht annehmen dürfen, dass die Vorgänge, die den acuten Erscheinungen zu Grunde lagen, *neben* denen einhergingen, die Ursache des Defectes sind, und dass die letzteren auch nach "Ausheilung" der acuten Vorgänge stationär oder sich weiter entwickelnd ihre Wirkung entfalten. Die Berechtigung und Notwendigkeit *dieser* Scheidung erhellt am einwandfreisten aus der Betrachtung der Paralyse; mit vollem Recht hat neuerdings *Schröder* wieder einmal auf die viel zu oft übersehene Erfahrung hingewiesen, dass sich ein—auch für praktische Fragen bedeutsames—genügendes Verständnis der Remissionen der Paralytiker nur gewinnen lässt, wenn man zwischen den zunächst restituierbaren im engeren Sinne psychotischen Erscheinungen und den vielfach besserungsunfähigen und auch von den Remissionen unbeeinflussten Ausfallserscheinungen prinzipiell scheidet.

Hier beschäftigt uns eine andere Frage: können *dieselben* Erscheinungen, die wir bei einem Patienten zuletzt als Teilerscheinungen eines definitiven Defectzustande constatiert haben, eventuell vorher schon als transitorische, restituierbare Ausfälle nachweislich gewesen sein; trifft das zu, dann glaube ich, wird auch der Schluss gezogen werden dürfen, dass auch der gleiche *Vorgang* unter wechselnden Verhältnissen (in Betracht käme eventuell die Intensität oder die Dauer desselben)—einmal transitorische, ein andermal definitive Ausfälle herbeiführen kann; ich glaube, dass

die klinische Erfahrung im Sinne dieser Annahme spricht. Ich könnte an die presbyophrenen Zustände erinnern, die wir beim gleichen Individuum etwa im Anschluss an eine Infektionskrankheit oder eine akute vasculäre Schädigung des Gehirns oder, was weniger bekannt zu sein scheint, an eine allgemeine Circulationsstörung auftreten sehen, um sich zunächst wieder total zu restituierten, die dann bei Wiederholung der gleichen Schädigung jeweils recidivieren, um mit jedem folgenden Male sich weniger gut zurückzubilden, bis zuletzt ein sich *nicht* mehr restituierender Defect verbleibt, der, soweit es die hier ausschliesslich interessierenden Ausfallserscheinungen betrifft, in jeder Hinsicht dem ersten und zunächst genesenen entspricht; ich möchte mich aber nicht an dieses Beispiel halten, da gerade die Qualification dieser presbyophrenen Zustände als Demenz von *Wernicke* selbst, der den Zustand als erster charakterisierte und den Namen schuf, bestritten wurde; ich gehe aus demselben Grunde auf die symptomatologisch zum grossen Teil identischen anderweitigen Zustände mit der Symptomatologie der Korsakow'schen Psychose nicht ein, trotzdem der Verlauf all' dieser Zustände—am einwandfreisten wohl bei den alkoholischen Formen, die begreiflicherweise am meisten zu Recidiven neigen,—die obige Bedingung erfüllt: Auftreten von Ausfallserscheinungen, die zunächst wieder schwinden, mit jedem Recidiv aber wieder auftreten und mit jedem folgenden Male unvollständiger sich restituierten. Ich möchte hier vielmehr an einen Krankheitsprozess erinnern, über dessen Ausgang in Demenz wohl allgemeine Uebereinstimmung herrscht: die Epilepsie. Es ist wohl schon länger bekannt, dass mit der zunehmenden Dauer der Erkrankung und dem fortschreitenden Verfall der Kranken die Grenzen der acut psychotischen Phasen gegen den Habitualzustand sich immer mehr verwischen, so dass man bei sehr schweren terminalen Epilepsien nicht einmal mehr den Anfang, geschweige denn das Ende der acuten Zustände deutlich praezisieren kann. Diese Erscheinung ist nicht ausschliesslich darauf zurückzuführen, dass gewissermassen die Niveaudifferenz der Curve, in der sich der *Gesammtverlauf* der Psychose darstellen lässt, geringer wird, wenn sie sich nicht mehr vom "Nullpunkte" der Norm an erhebt: man kann vielmehr individuell nachweisen, wie Einzelsymptome aus den acuten Zuständen in jeweils stärkerem Masse nach jeder Attacke in das nachfolgende Intervall mit hinüber genommen

werden. Ich habe auf einschlägige Beobachtungen schon vor längerer Zeit anlässlich der Besprechung der Sprachstörungen der Epileptiker hingewiesen; lange fortgesetzte Untersuchungen in meiner Klinik, über die *Polet* berichtet hat, haben dasselbe für zahlreiche andere Symptome erweisen können und zwar nicht nur für solche Symptome, die gewissermassen aktiv, wie gewisse Wahnbildungen, residuär weiter bestehen, sondern auch für Ausfallsymptome, die zunächst nur andeutungsweise und zuletzt doch noch sich restituerend später deutlich und irreparabel die acuten Psychosen überdauern, so dass also tatsächlich der epileptische Dauerzustand bis zu einem gewissen Grade als eine Summe der Residuen der aufeinander folgen acuten Zustände—auch in Bezug auf die Ausfallerscheinungen—aufgefasst werden kann. Diese Auffassung und Betrachtungsweise wird dem Verständnis näher gerückt, wenn man sich einigermassen ähnlicher Vorgänge auf somatischem Gebiete erinnert; die typischsten Analoga bietet hier die progressive Paralyse, in erster Linie jene nicht gerade seltenen Formen, die zuletzt zum Bilde der spastischen Paraparese mit schwerster Sprachstörung, kombiniert mit anderen Erscheinungen vom Charakter der Pseudobulbärparalyse geführt haben; in der übergrossen Mehrzahl dieser Fälle sind anamnestisch zahlreiche paralytische Anfälle—mit oder ohne Reizerscheinungen—zu eruieren, und die Entwicklung erfolgt dann in der Weise, dass jeweils nach dem Anfall schwere Lähmungsscheinungen zu constatieren sind, die nach dem ersten bis auf geringe Reste und nach jedem folgenden immer weniger vollständig wieder zurück gehen, bis zuletzt auch hier die Summe der Residuen einen schweren Ausfall darstellt.

Es wird später darauf zurückzukommen sein, zu welchen Schwierigkeiten bezüglich der anatomischen Begründung der Demenz diese zunächst *rein* klinischen Erfahrungen Anlass geben können; zunächst sei nur ganz kurz darauf hingewiesen, wie gerade diese auffallende Analogie in der Entwicklung der Demenz und gewisser *rein* körperlicher Störungen besonders geeignet ist, die besondere Stellung der Demenz auf der Grenze zwischen den in engerem Sinne psychotischen Symptomen und den reinen Herdsymptomen zu illustrieren, eine besondere Stellung, die uns immer wieder die Hoffnung wecken muss, wenn überhaupt auf dem

Umwege über die Kenntnis der Demenz den Zugang zu einer hirnpathologischen Auffassung der Psychosen zu finden.

Noch viel schwieriger erscheint es zur Zeit, eine auch nur einigermassen befriedigende Antwort auf die Frage zu finden, welcher *Art* oder *welchen Umfanges* die eingangs erwähnte psychische Minderleistung sein muss, um den Befallenen im Sinne der Wissenschaft dement erscheinen zu lassen; hier machen sich neben Definitionsfragen vor Allem auch Differenzen in der Gesamtauffassung alles psychischen Geschehens geltend. Es soll im Folgenden versucht werden, all' derartige Fragen nach Möglichkeit auszuschliessen und die Erörterung auf einem Boden zu führen, auf dem sich auch Vertreter entgegenstehender principieller Auffassungen zusammenfinden können.

Die Frage lässt sich auch einigermassen anders formulieren: dahin, ob man überhaupt berechtigt ist, von *der* Demenz in dem Sinne zu sprechen, dass darunter ein in allen einschlägigen Fällen identischer, nur quantitativ von einem Falle zum andern oder bei demselben Falle von Zeitpunkt zu Zeitpunkt differierender Zustand zu verstehen wäre. Jedes elementare Lehrbuch der Psychiatrie scheint die Antwort auf diese Frage und zwar in verneinendem Sinne zu enthalten: Wir kennen eine paralytische, senile, arteriosclerotische, hebephrene, epileptische Demenz. Thatsächlich aber diagnostizieren wir nicht diese speciellen Demenzen, sondern wir diagnostizieren die Erkrankung Paralyse, das Senium, die Arteriosclerose, die Hebephrenie, die Epilepsie und wir legen der bei diesen Erkrankungen gefundenen Demenz den Namen der Grundkrankheit bei. Die Diagnose der Grundkrankheit aber erfolgt an sich auf Grund von Symptomen, die zum allergrössten Teil mit der Demenz keinerlei symptomatologische Beziehungen haben, zum Teile (Paralyse, Arteriosclerose, Epilepsie) rein körperlicher Art sind und, auch soweit sie psychisch sind (Hebephrenie) *an sich* nicht einmal den allgemeinen Character der Ausfallserscheinungen zu tragen brauchen.

Die Frage der specifischen Demenzen bliebe demnach noch offen; theoretisch wären zwei Möglichkeiten gegeben: nach Abzug all' der eben als diagnostische Hilfsmittel genannten Erscheinungen könnte ein Defectzustand übrig bleiben, der in *allen* Fällen identisch den Zustand der (dann einheitlichen) Demenz darstellte, oder es könnten wieder nach diesem Abzug in den verschiedenen

Fällen Ausfallscombinationen verschiedener Zusammenstellung übrig bleiben; daraus müsste unabweisbar der Schluss gezogen werden, dass statt *einer* Demenz thatsächlich mehrere essentiell verschiedene Formen der Demenz bestehen, gleichviel ob diese verschiedenen Formen jeweils in typischer Ausbildung gerade den uns zur Zeit bekannten Krankheitsformen zugeordnet sind, und vor Allem, ob wir heute schon imstande sind, *rein* auf Grund dieses postulierten specifischen, reinen Defectzustandes etwa die Diagnose der Grundkrankheit ohne die erwähnten Hilfsmittel zu stellen.

Es ist unschwer einzusehen, dass, was hier bezüglich der Demenz ausgeführt wurde, in gleicher Weise—allerdings gewissermassen mit positivem statt negativem Vorzeichen—auch für die Intelligenz Geltung beanspruchen kann, und es kann vielleicht der weiteren Erörterung zu Gute kommen, wenn man sich zunächst über die einschlägigen Verhältnisse klar zu werden versucht; auch bezüglich der Intelligenz ist die Frage erhoben und untersucht, ob sie eine einheitliche Erscheinung darstellt, von der eine Reihe speziellerer abhängig sind, oder eine Summe verschiedener, jeweils in wechselnder Weise zusammengesetzter Componenten. Auf Grund experimenteller Untersuchungen hat man bekanntlich die erstere Auffassung als die richtigere annehmen zu dürfen geglaubt. Die hohe Correlation, die *Krueger* und *Spearman* zwischen einer Reihe relativ einfacher psychischer Leistungen feststellen konnten, führten sie zu der Annahme, dass zum wenigsten diese Leistungen (zu denen bemerkenswerter Weise das Auswendiglernen nicht gehörte) von der Wirkung eines bestimmten "Centralfactors" abhängig seien. Bei aller Anerkennung der Bedeutung solcher Untersuchungen wird man aber einen von den Autoren selbst hervorgehobenen Gesichtspunkt nicht ausser Acht lassen dürfen: dass die von ihnen geprüften Leistungen der "eigentlichen Intelligenz" im höheren Sinne noch recht ferne stehen. Der "Eindruck," dass die Intelligenz im engeren Sinne etwas von Fall zu Fall verschiedenes darstelle, ein Eindruck, den die unvoreingenommene tägliche Beobachtung zu machen geeignet ist, könnte daneben also sehr wohl zu Recht bestehen; ja man kann bezweifeln, ob es jemals gelingen wird, diese Intelligenz im höheren Sinne, die eben etwas individuelles, schwer vergleichbares und noch schwerer messbares darstellt, überhaupt einer exacten Untersuchung mit

zahlenmässig und tabellarisch festzustellenden Resultaten zugänglich zu machen.

Unter den hier skizzierten Gesichtspunkten verdient nun vor Allem das Verhältnis der Intelligenzprüfung zur Demenzprüfung betrachtet zu werden. Die Meinung scheint fast allgemein verbreitet, dass dieselben Methoden, *i. e.*, die qualitativ *und* quantitativ gleichen Aufgaben sowohl für die Intelligenz-, wie für die Demenzprüfung geignet wären, ja dass beide Prüfungen eigentlich zusammenfielen; diese Auffassung läge besonders nahe, wenn man annimmt, dass sich alle Grade von der tiefsten Demenz an bis zur höchsten Intelligenz in eine einfache Reihe ordnen liessen; unter diesem Gesichtspunkte wird dann auch ein Vorwurf verständlich, den neuerdings *Stern*, allerdings von einem sehr engbegrenzten Begriff der Intelligenz ausgehend, der Methodik der Psychiatrie gemacht hat: dass sie nämlich den Begriff der Intelligenz viel zu weit gefasst habe und darunter Eigenschaften begreife, die mit der "eigentlichen Intelligenz" nichts zu tun hätten. Ganz abgesehen davon, ob sich zur Zeit eine derartige eigentliche Intelligenz überhaupt oder speciell nach der von *Stern* vorgeschlagenen Formel abgrenzen lässt, glaube ich, dass dabei der grundsätzliche Unterschied zwischen der Arbeitsweise und der Fragestellung des Psychologen und des Psychiaters übersehen wird: der erstere sucht nach Methoden der Intelligenzprüfung, der letztere sucht Demenzzustände festzustellen: das bedingt nicht nur selbstverständliche quantitative Differenzen, insofern etwa die verfügbaren Minimalaufgaben zur Schwachsinnsprüfung noch viel geringere Anforderungen zu stellen haben werden, als die einfachsten im Intelligenzprüfungsschema, sondern auch weitergehende: man wird annehmen dürfen, dass es tatsächlich Fähigkeiten gibt, deren *Erhaltensein* oder selbst höchste Entwicklung die Untersuchten noch nicht als intelligent erscheinen lassen wird, und die doch nicht *ausfallen* können, ohne das Individuum *defect* zu machen. Es genüge, an die Merkfähigkeit zu erinnern, die bekanntlich selbst bei Idioten gelegentlich einmal sogar extrem ausgebildet sein kann, ohne dass doch gleichwohl die sonstigen Demenzsymptome auch nur im Mindesten compensiert würden, deren Wegfall aber gleichwohl das betroffene Individuum dement in dem unten zu umschreibenden Sinne erscheinen lassen muss.

Selbst angenommen also, dass tatsächlich *die* Intelligenz etwas einheitliches darstellt und dass es dann—eine selbstverständliche Consequenz dieser Auffassung—möglich wäre, als Gradmesser dieser Intelligenz eine oder einige wenige Prüfungsaufgaben zu finden, deren Resultate in hoher Correlation zu den andern stehend uns der Mühe der Prüfung oder Schätzung aller Einzelfunctionen entheben würden, wie es ja das Endziel der verschiedenen Testmethoden ist: für die Demenzprüfung werden wir immer noch eine Reihe specieller Aufgaben zur Verfügung haben müssen, die auch diejenigen Ausfälle zu constatieren gestattet, welche von den Intelligenzprüfung nicht erfasst werden und nach dem Obigen eben nicht erfasst werden können, ja nicht einmal erfasst zu werden brauchen.

Aus diesen Ueberlegungen ergibt sich aber auch, dass die Wahrscheinlichkeit, zu einer einheitlichen Auffassung für die Demenz als solche zu kommen noch geringer ist als für die Intelligenz—man müsste denn annehmen dürfen, dass *alle* diejenigen Leistungen, die der Intelligenz angehören, inclusive derjenigen weiteren, die bei der Demenz geschädigt sind, zusammen von irgend einem Centralfactor höherer Ordnung abhingen.

Was sich bisher hat feststellen lassen, spricht keineswegs in diesem Sinne; allerdings haben *Foerster* und *Gregor*, die im Anschluss an die Normaluntersuchungen von *Krüger* und *Spearman* Untersuchungen bei progressiver Paralyse ausgeführt haben, feststellen können, dass auch beim Paralytiker zwischen den Vorgängen, die beim Normalen in Correlation stehen, sich Zusammenhänge nachweisen lassen (soweit deren Prüfung beim Paralytiker überhaupt möglich ist!) und dass diese in Correlation stehenden Functionen durch den der Krankheit zugrunde liegenden Process in annährend gleichem Grade geschädigt werden; sie haben aber auch das grundsätzlich noch viel wichtigere Resultat erhoben, dass eine ausserhalb dieser Correlation stehende Leistung, die Lernfähigkeit, nicht nur generell in abweichendem Grade geschädigt wird, sondern auch individuell beim Paralytiker in sehr wechselnder Weise gelitten haben kann, bald mehr bald weniger als die eben erwähnten Functionen geschädigt erscheint.

Wenn dies schon innerhalb einer, noch dazu auch durch die anatomische Untersuchung als einheitlich erwiesenen Erkrankungsform von Individuum zu Individuum geschehen kann, dann

würde man von vornherein zu erwarten haben, dass bei verschiedenen Processen a potiori solche Differenzen auftreten werden. Der Nachweis dieser Differenzen, noch mehr die Herausschälung von Differenzen, die für die verschiedenen Erkrankungen als *typisch* zu erachten wären, ist allerdings schwieriger, als den einfachen oben umschriebenen Voraussetzungen zu entsprechen scheint: es ist oben davon ausgegangen, dass die Demenz nur den reinen Defectzustand darstellen soll, dass also alles, was nicht einfach als Ausfallssymptom zu erachten ist, für die Symptomatologie der Demenz *i. e.*, S, also auch für die Differentialdiagnose der verschiedenen Demenzformen *nicht* in Betracht kommen soll, auch wenn diese weiteren Symptome für die Diagnose der Grundkrankheit von grosser, eventuell sogar ausschlaggebender Bedeutung sein mögen.

Die genannten Schwierigkeiten sind zum Teil mehr äusserlicher Art; zahlreiche im engeren Sinne psychotische Störungen—*Affecte*, wahnhaftes Auffassung der Untersuchung—können eine eigentliche Defectprüfung unmöglich machen; viel grösser ist die andere Schwierigkeit: zu entscheiden, wie die theoretisch so einfache Trennung zwischen Defectorscheinungen und psychotischen im engeren Sinne factisch zur treffen ist. Das typischste Beispiel für diese Schwierigkeit ist wohl der lange Zeit geradezu mit Erbitterung geführte, jetzt zwar nicht entschiedene, aber doch einigermassen zur Ruhe gekommene Streit über die Demenz der Paranoiker: ob, wie die einen meinten, die Uncorrigierbarkeit auch der *uns* ganz absurd erscheinenden Wahnideen aus dem Wesen der Wahnideen selbst sich ergebe, oder ob die Erscheinung eine daneben bestehende Demenz zur Voraussetzung habe und damit implicite als Beweis einer solchen erachtet werden dürfe. Es will mir scheinen, dass derartige Fragen der Lösung überhaupt nicht zugänglich sind, solange man sich an den Begriff einer einheitlichen Demenz klammert, weil sie nicht durch Beibringung und kritische Verwertung neuen Materials zu lösen sind, sondern stets je nach der subjectiven Auffassung vom Wesen der Demenz, wovon der einzelne Beurteiler ausgeht, verschieden beantwortet werden. Unter demselben Gesichtspunkte könnte man auch eine andere Frage aufwerfen, die zunächst sehr überraschend und revolutionär klingen mag: ob man eigentlich selbst in den Endzuständen der *Dementia praecox* von einer

Demenz in dem oben umschriebenen Sinne, von einer einfachen Minderleistung, sprechen darf. Es ist immer wieder darauf hingewiesen worden und ausgedehnte Untersuchungen, die Penon neuerdings an den uns zur Verfügung stehenden langjährigen Anstaltsinsassen gemacht hat, haben dafür wieder schlagende Beispiele geliefert, wie gering bei diesen Zuständen eigentlich der wirkliche Defect ist, wie die Kranken nicht nur sehr viel wissen, sondern tatsächlich auch bei der Demenzprüfung viel *leisten*, wenn die Umstände günstig sind, das heisst, wenn diejenigen Momente sich *nicht* störend gelten machen, die vielfach die Prüfung unmöglich machen oder den *Schein* des schweren Ausfalls hervorrufen. Es ist ebenso bekannt, wie sehr der Einfluss dieser Momente schwankt, von Minute zu Minute, auch abhängig von äussern Einflüssen, Person des Untersuchers u. ä. Es kann darum auch nicht die Rede davon sein, dass es sich dabei etwa um zunächst jeweils restituierbare Ausfälle handle, wie sie eingangs erwähnt wurden; dem widerspräche ausser diesen schrullenhaften Schwankungen gerade die Erfahrung, dass es auch in den Terminalstadien eben *nicht* zum definitiven Ausfall kommt. Die Auffassung lässt sich zum Mindesten nicht von vornherein von der Hand weisen, dass der Eindruck der Verblödung nicht durch einen *Ausfall* in dem mehrfach unschriebenen Sinne, sondern durch andere Momente bedingt ist, die gleichviel wie man sie auffasst und benennt (Motilitätsymptome, Sperrung, Negativismus), den sonstigen echt psychotischen näher stehen als den Defecterscheinungen und die ihren gewissermassen irritativen Charakter im Gegensatz zu den reinen Ausfallserscheinungen gerade in dieser Tendenz zu plötzlichen Schwankungen dokumentieren.

Aber auch wenn man von all' diesen strittigen Categorien absieht, wenn man sich weiterhin auf diejenigen Zustände beschränkt, bei denen tatsächlich auch die Prüfung des reinen Defectes möglich ist, auch dann noch scheint mir die Folgerung unabweislich, dass dieser *reine* Defect nicht einheitlich ist, dass vielmehr die Componenten desselben sicher von Krankheitsgruppe zu Krankheitsgruppe, und wahrscheinlich ebenso wie es oben für die Paralyse angeführt wurde, auch für andere Gruppen von Fall zu Fall variieren. Die *reine* paralytische Demenz stellt—aller sonstigen charakteristischen und für die Diagnose zur Zeit noch ausschlaggebenden Momente entkleidet—etwas anderes dar als etwa die

epileptische Verblödung; jene ganz eigenartige Störung der combinatorischen Fähigkeit, die man in den acuten epileptischen Zuständen auftreten und in die Defectzustände hinein persistieren sieht, ist der paralytischen Demenz im Allgemeinen fremd; (die typischste Illustration dafür liefert die vergleichende Prüfung mit den von mir eingeführten Serienbildern); die *schwere* Störung der Merkfähigkeit, die man bei den jetzt wohl allgemein als Demenzformen aufgefassten presbyophrenen Zuständen auftreten sieht, werden bei der Epilepsie überhaupt nicht und bei der Paralyse vielfach erst in denjenigen Stadien erreicht, in denen das psychische Leben überhaupt dem Erlöschen nahe ist; wieder andere Züge scheinen die jugendlichen Schwachsinnssformen darzubieten; dass sie nicht etwa nur durch das eine gemeinsame Merkmal von anderen Schwachsinnzuständen verschieden sind, dass sie in der Entwicklungsperiode sich geltend gemacht resp. die geistige Entwicklung aufgehalten haben, lässt sich schon daraus ableiten, dass auch der Defect bei verschiedenen Idioten oder Imbecillen abgesehen von den quantitativen Differenzen, schon für die grobe klinische Betrachtung sich auch als qualitativ verschieden resp. aus verschiedenen Componenten zusammengesetzt zeigt; als typischste Beispiele dafür seien die Idioten mit einseitigen Begabungen in Erinnerung gerufen.

Man kann gleichwohl gegen diese ganze Auffassung Bedenken geltend machen, zunächst ein mehr theoretisches, um nicht zu sagen doctrinäres: dass nämlich diese Auffassung, indem sie die Demenz als Summe aus einer Reihe wechselnder Componenten betrachte, auf die Einheitlichkeit alles geistigen Geschehens nicht genügend Rücksicht nehme. Es will mir scheinen, dass dieser Einwand ohne Weiteres hinfällig wird, wenn man sich darüber klar wird, dass diese "Einheit" selbstverständlich gestört werden muss, gleichviel welche Teile ausfallen oder ungenügend funktionieren, und dass also eine Beeinträchtigung dieser Einheit stets die Folge sein wird, gleichviel ob man den Defect in allen Fällen denselben oder von Fall zu Fall resp. Krankheitsgruppe zu Krankheitsgruppe wechselnd sein lässt.

Viel ernster und tatsächlich erwägenswerter erscheint ein anderer Einwand: es musste oben schon darauf hingewiesen werden, dass diejenigen Untersuchungsmethoden, die uns ein *einigermassen exactes* Arbeiten und die Gewinnung vergleichbarer Resultate

gestatten, der "eigentlichen" Intelligenz gegenüber sich noch als unzureichend erwiesen haben und vielleicht immer erweisen werden. Man kann die Frage erheben, ob denn die *Methoden*, mittels deren wir die Demenz prüfen und vergleichen, trotz der relativ günstigeren Bedingungen nicht gleichfalls das eigentlich *Essentielle* der Demenz verfehlten, oder ob, positiv ausgedrückt, diejenigen Ausfälle die wir mit diesen Methoden feststellen, tatsächlich das *Wesen* der Demenz ausmachen.

Die Frage liegt um so nährer, wenn man sich einer Beobachtung erinnert, die uns gerade bei der oben erwähnten Untersuchung alter Anstaltsinsassen durch *Penon* ganz besonders deutlich geworden ist, dass sich nämlich unter Umständen einmal bei einem alten Circulären ein *Dauerzustand* entwickeln kann, in dem die verschiedenen Prüfungsaufgaben viel schlechtere Resultate ergeben, als man sie häufig bei *Dementia praecox* zu erhalten pflegt, *ohne* dass der Betroffene gleichwohl auch nur entfernt in demselben Masse dement erscheint; die Momente, von denen es abhängt, warum uns ein Kranker, bei dem die *Demenzprüfungsmethoden* ein viel schlechteres Resultat ergeben haben, doch weniger dement erscheinen kann als ein anderer, der bei dieser Prüfung viel besser bestanden hat, (ein Widerspruch, der sich wieder nicht nur von einer Psychose zur anderen, sondern auch z. B. beim Vergleich verschiedener Paralytiker untereinander aufdrängen kann), entziehen sich tatsächlich einer exacten Formulierung, geschweige denn Untersuchung; wenn jemand behaupten würde, dass auch die Funktionen, die wir jetzt bei der *Demenzprüfung* untersuchen, noch nicht die wesentlichen sind, dass ihre Störungen *nicht* das eigentliche Wesen der Demenz ausmachen, dass sie ebenso als *nicht* essentielle Erscheinungen neben der eigentlichen Demenz einhergehen, und bei durchdringender Betrachtung von dieser gesondert werden müssen, wie es oben für die *i. e. S.* psychotischen Componenten verlangt wurde: ich glaube, er wäre kaum mit beweisenden Gründen zu widerlegen, und es wäre ihm höchstens einzubwenden, dass auch diese "eigentliche Demenz" nichts einheitliches darzustellen scheint, dass die Veränderung der Gesamtpersönlichkeit, oder was man sonst als Ausdruck oder Criterium der Demenz an sich betrachten will, eben wieder etwa beim Epileptiker anders sich darstellt als beim Paralytiker. Man käme wieder zu der Frage: sind vielleicht auch diese Differenzen wieder nur unwesentliche Corollarsymptome der wirklichen centralen Störung?

und man würde sich zuletzt in nutzlose und uferlose Erwägungen und Discussionen verlieren können, nicht darüber, was die Demenz ist, sondern was darunter verstanden werden soll.

Die klinische Psychiatrie kann auf diesem Wege keine Fortschritte erwarten, und sie würde selbst in der Voraussetzung, dass die aufgeworfenen Fragen wirklich später einmal der Lösung näher zu bringen wären, zur Zeit Mangels jeder entsprechenden Methodik eben darauf verzichten müssen, sie in Angriff zu nehmen, bis ihr entweder der eigene Fortschritt oder der Fortschritt der Nachbarwissenschaften, vor Allem der Psychologie, die nötigen Waffen geliefert hat; sie wird sich, und auf diesem Gebiete werden sicher noch Erfolge zu erzielen sein, darauf beschränken müssen, zunächst das Studium der uns zugänglichen Symptome auszubilden und zu vertiefen. Dabei wird sich voraussichtlich vor Allem ergeben, dass manche Anforderungen, die wir jetzt an die Untersuchten stellen zu müssen glauben, wegfallen müssen, und dass recht viele "Defecte," die wir als Ausdruck der Verblödung anzusprechen geneigt sind, diese Bedeutung nicht haben. Es würde den Rahmen eines Vortrages, der nur einige Hauptprobleme hervorheben soll, überschreiten, hier die Details der Untersuchungsmethodik zu besprechen. Es darf aber doch daran erinnert werden, wie sehr sich innerhalb weniger Jahre die Wertschätzung von *Wissensdefecten* als Ausdruck und Beweis der Demenz verändert hat; zweifellos werden Kenntnisdefecte auch heute noch vielfach als Ausdruck und damit auch als Beweis der Demenz anzuerkennen sein, und in den hierhergehörigen Minderleistungen bei der beginnenden Paralyse werden wir immer eine der typischsten Erscheinungen dieser typischen Demenzerkrankung sehen; aber sehr vieles von dem, was man noch vor gar nicht allzulanger Zeit namentlich auch in gerichtlichen Gutachten als Beweis des Schwachsinns angeführt finden konnte, ist heute als normal anerkannt; die Resultate einschlägiger Untersuchungen, die *Rodenwaldt* seinerzeit auf meine Veranlassung vorgenommen, die zunächst vielfach angezweifelt, bald mehrfach bestätigt und nun wohl allgemein anerkannt sind, haben gelehrt, dass man *allgemeine* Anforderungen überhaupt nach dieser Richtung kaum formulieren kann, dass das Mass der Anforderungen und damit die Würdigung von Minderleistungen nur nach Massgabe *individueller* Verhältnisse geschehen kann, und dass derartige Prüfungen darum zum Mindesten

nicht geeignet sind, vergleichbare Resultate auf Grund generell festzustellender Standardanforderungen zu ermöglichen.

Die Tendenz der modernen Demenzprüfungsmethoden, die sich in gleicher Richtung besonders zielbewusst in den von *Binet* inaugurierten Testprüfungsmethoden der Intelligenz dokumentiert, geht nun berechtigterweise dahin, bei der Prüfung und Schätzung das schulmässig oder sonstwie Erworbene nach Möglichkeit auszuschalten.

Wie weit das Resultat bei der Intelligenzprüfung der *Kinder* zu erreichen sein wird, wie weit insbesondere die Testmethode die auf sie gesetzten Hoffnungen auf die Dauer erfüllen wird, kann hier nicht verfolgt werden. Aber auf die Schwierigkeiten, die sich der Erfüllung dieser Forderung beim Erwachsenen entgegenstellen müssen, mag doch eben hingewiesen werden.

Die Aufgabe, deren Lösung hier versucht wird, kommt etwa dem Versuche gleich, die Leistungsfähigkeit einer Maschine zu prüfen, die man leer laufen liesse; die Schwierigkeiten, die eine derartige Prüfung an sich darbietet, werden nun noch vermehrt erscheinen, wenn man berücksichtigt, dass im vorliegenden Falle das wenige Material, das zum Zwecke der Prüfung zur Verfügung gestellt werden muss—selbst wenn es gelänge, dieses auf die conventionellen Ausdrucks- und Verständigungszeichen zu reduzieren—zum grössten Teile durch die Maschine selbst geschaffen ist, und wenn man weiter berücksichtigt, dass die "Maschine" selbst unter dem Einflusse der geleisteten Arbeit ihrerseits Modificationen erfährt, die jeweils ihre spätere Leistungsfähigkeit beeinflussen. Auch bei denjenigen Prüfungen, die theoretisch der gestellten Forderung wirklich zu entsprechen scheinen, wird man diese Einschränkung zu berücksichtigen haben, und man wird erwarten dürfen, dass auch bei der bestausgedachten Prüfung beim Erwachsenen, sich der Einfluss von individuellen, Milieu- und anderen wechselnden Umständen geltend machen muss, so dass als schon darum, und wir kämen damit wieder zu demselben Schlusse, wie durch frühere Ueberlegungen, das Bestehen und besonders die Nachweisbarkeit einer einheitlichen Demenz unwahrscheinlich werden muss.

Dass man gleichwohl zu dem einheitlichen Begriff der Demenz gekommen ist und daran festhält, lässt sich unter Berücksichtigung historischer und practischer Gesichtspunkte verstehen; die Heraushebung der Defectzustände aus der Gesamtmenge der psy-

chischen Störungen war von vornherein nicht so selbstverständlich als sie uns heute erscheinen mag: hatte doch selbst der Ausdruck Demenz nicht überall und zu allen Zeiten die specifische Bedeutung, die ihm heute zukommt; nachdem aber einmal die Scheidung gemacht war, scheint selbst über die Kreise der Psychiatrie hinaus ein Bedürfnis und Verlangen nach Aufrechterhaltung dieser Trennung sich geltend zu machen. Beweis dafür wohl, dass selbst moderne Gesetzgebungen *neben* der Geisteskrankheit die Geisteschwäche speciell erwähnen zu müssen glaubten, wenn auch mit anderem Erfolge, als bei der Formulierung der Bestimmungen beabsichtigt und erwartet war.

Gerade dieser Erfolg resp. Misserfolg der Einführung des Begriffes einer einheitlichen Demenz in die Praxis mag als ein weiterer Beweis für die derzeit wenigstens bestehende Unmöglichkeit erachtet werden, einen solchen Begriff zu umschreiben. Ich habe mich tatsächlich vergeblich bemüht, eine Umschreibung für das zu finden, was die unvoreingenommene Empirie als Blödsinn resp. Schwachsinn bezeichnet. Im Gegensatz zu der wissenschaftlichen Betrachtung, die von Elementarscheinungen oder von mehr theoretischen Voraussetzungen ausgeht, ist die Praxis begreiflicherweise geneigt, den Massstab der socialen Brauchbarkeit des Individuums anzulegen; *was* aber social verlangt wird, wird nicht nur nach der gesellschaftlichen Stellung und andern Verhältnissen des zu Beurteilenden, sondern auch nach dem Standpunkte der Urteilenden selbst so verschieden sein, dass ich den erwähnten Versuch aufgeben zu müssen glaubte; so wird es verständlich, dass—ebenso wie die Wissenschaft—auch die Praxis über die Beurteilung der Geisteschwäche desselben Individuums, unter Umständen auf Grund derselben tatsächlichen Unterlagen zu recht verschiedenen Schlüssen kommen kann, ganz zu schweigen von den Differenzen, die sich in dieser Beurteilung zwischen Psychiatern und Laien resp. öffentlicher Meinung ergeben können und gerade auf forens-psychiatrischem Gebiete leider oft genug ergeben.

Hier wiederholt sich tatsächlich mit negativem Vorzeichen, was sich mit positivem auf dem Gebiete der Beurteilung der Intelligenz begiebt; auch hier entscheidet für die Praxis die sociale Wertigkeit und vor Allem—der Erfolg. So kann es nicht wunder nehmen, dass je nach den *practischen* Idealen des zur Beurteilung Be-

rufenen oder sich berufen Fühlenden, sein Urteil auch über die Intelligenz differieren wird, und dass selbst das Urteil über die gleiche Person mit dem Augenblicke sich ändern kann, wo die praktische Wertigkeit seiner Tätigkeit augenfällig wird: immer auf's neue wiederholt sich die Erfahrung, dass der Gelehrte oder Erfinder für dessen "blödsinnige" und "hirnverbrannte" Tätigkeit die Menge nur ein billiges Lächeln übrig hatte, zum Genie wird, sobald ihm die Sonne des Erfolges zu lächeln beginnt, und umgekehrt liessen sich Beispiele genug dafür aufweisen, dass auch durch senile oder andere geistige Schwächezustände merkbar beeinflusste Producte mit ehrfürchtiger Bewunderung weiter akzeptiert werden, wenn der Autor einmal den Ruf seiner Geisteskraft gefestigt hat. Es genüge ein ganz kurzer Hinweis auf diese Verhältnisse um die ganze Compliciertheit der einschlägigen Probleme zu illustrieren.

Unter rein psychiatrischen Gesichtspunkten näher liegt eine andere Analogie, auf die wenigstens ganz kurz hingewiesen sei: mit der *Bewusstseinsstörung*. Auch hier zunächst rein theoretische Differenzen über die Kriterien, von denen die Annahme einer solchen abhängig gemacht werden soll: ich erinnere nur an die Frage, ob die blosse nachträgliche Amnesie eventuell als Beweis für das Vorliegen einer Bewusstseinsstörung geltend gemacht werden darf, mit all ihren Consequenzen, die m. E. dahin geführt haben, dass z. B. der Begriff der Epilepsie durch Einbeziehung der Fugue- und verwandten Zustände eine unerlaubte Ausdehnung gewann. Auch hier die zunächst überraschend erscheinende Erfahrung, zu der uns Untersuchungen an Epileptikern (*Polet*), Typhuskranken (*Hendriks*) und Kranken mit *Commotio cerebri* geführt haben, dass auch nach Abzug derjenigen Symptome, die der jeweiligen Aetiologie spezifisch zuzugehören scheinen, doch der anscheinend einheitliche Zustand der Benommenheit sich noch jeweils aus verschiedenen Componenten zusammengesetzt erweist, und auch hier wieder das unbefriedigende Gefühl, dass die Summation dieser Elementarsymptome uns nicht *ohne Weiteres* die Benommenheit verständlich macht, so dass wieder der Verdacht sich regen muss, ob nicht doch hinter all diesen Einzelheiten sich noch etwas und gerade das Wesentliche verberge.

Eine Möglichkeit, rein klinisch-empirisch weiter als zu den der Untersuchung zugänglichen Elementarsymptomen durchzudrin-

gen, besteht nicht; zunächst werden wir uns also auf deren Untersuchung zu beschränken haben; solange sie in verschiedenen Fällen differente Resultate ergeben, werden wir, das möchte ich als Resultat dieser Ueberlegungen betrachten, berechtigt sein, von verschiedenen Demenzformen in dem Sinne zu sprechen, dass nicht nur je nach der differenten Aetiologie wechselnde accessorische Ercheinungen sich zur Demenz hinzugesellen, sondern dass auch die essentielle Demenz selbst sich aus von Form zu Form, vielleicht sogar innerhalb derselben Formen von Fall zu Fall variierenden Symptomen zusammensetzt. Soweit *die* Demenz uns als ein einheitliches Ganzes sich darstellen mag, erscheint, wenn auch nicht erschöpfend, doch befriedigender die Annahme, dass dieser Eindruck aus einer Summationswirkung verschiedener Componenten entsteht als die andere, dass die Einzelsymptome *verschiedene* Folgezustände *einer* gemeinschaftlichen Grundstörung sein sollten.

Noch wenige Worte zur Frage der anatomischen Begründung der Demenz: seit langem kennt man verschiedene anatomische Befunde bei zur Demenz führenden Psychosen und die Bedeutung, die der wissenschaftlichen Untersuchung der Demenz zukommt, hatte man nicht zum Mindesten daraus abgeleitet, *dass* man bei den zur Demenz führenden Formen constant auf anatomische Befunde zu rechnen habe; man hielt sie, wie oben schon einmal gestreift wurde, für in ganz besonderen Masse geeignet, die Brücke zu schlagen zwischen den organischen Gehirnkrankheiten im gewöhnlichen Sinne des Wortes und den reinen Geisteskrankheiten; man hoffte von ihnen aus, auch die anatomischen Grundlagen der letzteren finden zu können. Diese Hoffnungen scheinen nach einer Zeit einigermassen überschwenglicher Hoffnungsseligkeit wieder sehr vermindert; ja—in vielleicht wieder etwas übertriebener Schärfe—wird neuerdings mehrfach betont, dass *alle* Psychosen mit anatomisch nachweisbarer Grundlage zur Demenz führen müssten und dass bei allen anderen das Suchen nach pathologisch-anatomischen Veränderungen ergebnislos bleiben müsse.

Auch auf ein Eingehen auf diese Frage muss hier verzichtet werden, und die Besprechung wird sich auf einige kurze Bemerkungen bezüglich der anatomischen Befunde bei solchen Formen zu beschränken haben, die allgemein als verblödende anerkannt sind. Man wird wieder strenge zu scheiden haben zwischen

den Befunden, die der zugrundeliegenden Erkrankung *überhaupt* zugehören, und dem speciellen anatomischen Ausdruck für die klinisch festgestellten Defecterscheinungen; die Verhältnisse sind in beiden Beziehungen durchaus *nicht* identisch.

In ersterer Beziehung haben uns gerade die Forschungen des letzten Jahrzehnts, vor allem die Feststellungen *Nissls*, *Alzheimers* und der in ihrem Sinne weiter Arbeitenden wertvolle Fortschritte gebracht. Für eine Reihe von Zuständen haben wir jetzt tatsächlich soweit specifische Befunde, dass uns—ein altes Desiderat und eine sonst schwer empfundene Lücke—die autoptische Untersuchung eine Controlle der klinischen Diagnose liefert oder klinisch unverstandene Fälle erklärt. Es genüge an die Umschreibung eines wirklich für die Paralyse typischen Befundes zu erinnern, an die Differenzierung der senilen und arteriosclerotischen Veränderungen, die Heraushebung der "Alzheimer'schen Krankheit"; es sei ganz besonders betont, dass die wissenschaftliche Aufteilung des grossen Sammeltopfes der Idiotie, der angeborenen und früh erworbenen Defectzustände, im Wesentlichen unter der Führung der pathologischen Anatomie sich vollzieht.

Es muss aber zugestanden werden, dass den verschiedenen anatomisch zu umschreibenden und diagnostizierbaren Zuständen, sowohl denen der Entwicklungsalters als auch denen des höheren Lebensalters, durchaus noch nicht überall gleich specifische und diagnostizierbare psychische Krankheitsbilder entsprechen; (von den begleitenden cerebralen oder eventuell sogar allgemeinkörperlichen Störungen, die vielfach die Diagnose des zugrundeliegenden Zustandes und damit einen Schluss auf den zu erwartenden anatomischen Befund erlauben, muss in diesem Zusammenhange natürlich wieder abgesehen werden).

Von Beziehungen zwischen den verschiedenen anatomischen Befunden und den verschiedenen Formen der Demenz an sich kann begreiflicherweise noch viel weniger die Rede sein, und die oben schon erwähnte Erfahrung, dass die paralytische Demenz von Fall zu Fall noch verschieden sich gestalten kann, während doch der anatomische Process der Paralyse sicher ein einheitlicher ist, wird gewiss dazu beitragen, unsere Hoffnungen nach dieser Richtung nicht all zu hoch zu schrauben.

Selbst eine andere Frage ist von der Lösung noch viel weiter entfernt und gibt der zukünftigen Forschung noch viel mehr zu

tun, als man oberflächlich vermuten möchte: die *quantitativen* Beziehungen zwischen der Intensität der anatomischen Schädigung und dem Grade der Demenz. Die naheliegende Voraussetzung, dass dem Ausfall auf psychischem Gebiete auch ein Minus an funktionierender Substanz entsprechen werde, erscheint allerdings fast überall erfüllt: der *allegemeinste* Befund bei den Defectzuständen ist der der Agenesie oder Atrophie des Gehirns, und in den seltenen Ausnahmefällen, die zu dieser Voraussetzung in Widerspruch zu stehen scheinen, lässt sich mühelos nachweisen, dass die Volumen- oder Gewichtszunahme auf Rechnung *nicht* funktionierenden Gewebes zu setzen ist. Es erscheint aber ganz unmöglich, Beziehungen zwischen dem *Grade* der Atrophie und der Schwere der Demenz etwa in dem Sinne herzustellen, dass auf Grund des Gewichtes des Gehirns oder des mikroskopischen Aussehens der Hirnrinde ein Schluss auf den Grad der *in vivo* constatierten Demenz gezogen werden könnte, oder gar umgekehrt aus dem nachgewiesenen Grade des Schwachsins auf die Schwere der post mortem zu erwartenden Veränderungen geschlossen werden könnte: man findet immer wieder einmal paralytische Hirnrinden, deren hochgradige Atrophie im Verhältnis zu den klinisch nachweisbaren geringen Ausfallserscheinungen überrascht, andere, deren geringe Atrophie keine genügende Erklärung für die hochgradige Demenz ergibt, die *in vivo* festgestellt wurde, und man wird in diesem Zusammenhange an die Schwierigkeiten denken dürfen, die Remissionen der Paralyse mit dem anatomischen Befund zu vereinbaren, auch wenn man die oben schon einmal gestreifte Tatsache berücksichtigt, dass die *besten* und ausgiebigsten Remissionen durch Schwinden der psychotischen Erscheinungen im engeren Sinne zustande kommen; dass auch die reine Demenz einer gewissen Besserung zugänglich ist, ist nicht zu bestreiten, und die Erfahrung schliesst sich in allgemein-pathologischer Beziehung dem an, was oben über den Zusammenhang zwischen transitorischen und dauernden Ausfallserscheinungen überhaupt ausgeführt wurde. Es ist sehr gut denkbar—and in diesem Sinne sprechen die Erfahrungen über den Rückgang der paroxysmalen resp. postparoxysmalen körperlichen Erscheinungen bei der Paralyse, denen ja ein *sehr* grober anatomischer Prozess entspricht, dass auch derartige Prozesse einer gewissen anatomischen Rückbildung zugänglich sind; viel wichtiger aber scheint für die Auffassung

dieser Verhältnisse ein anderer Gesichtspunkt, der vielleicht nicht in allen einschlägigen Ueberlegungen genügend berücksichtigt wird: dass uns überhaupt über das Verhältnis der nachweislichen anatomischen Veränderungen zu den daraus notwendigerweise zu folgernden Ausfallserscheinungen recht wenig wirklich bekannt ist, dass wir, anders ausgedrückt, kaum für irgend ein nervöses Gebilde auch nur mit einiger Sicherheit anzugeben imstande sind, von welchem Grade der Schädigung an, wir daraus die—sei es zeitliche, sei es dauernde—Aufhebung der Function ableiten dürfen. Das gilt schon für relativ einfache Gebilde, deren Function uns wenigstens insofern bekannt ist, als wir wissen, welche *Art* von Störungen ihrem Ausfall entspricht; man hat immer wieder Gelegenheit, sich zu wundern, wie schwer es ist, klinisch nachgewiesene Seitenstrangsymptome und anatomisch nachweisbare Pyramiden-degeneration *quantitativ* auch nur einigermassen zur Deckung zu bringen, auch dann, wenn man nur *die* Fälle berücksichtigt, in denen Verlauf und Dauer der Veränderungen den Schluss erlauben, dass man es klinisch und anatomisch mit Dauerzuständen zu tun hat; es wäre auch dem Erfahrenen sicher kaum möglich sich aus den anatomisch gefundenen Hinterstrangerscheinungen über die Intensität der Symptome *in vivo* mehr als ein ganz oberflächliches Urteil zu bilden; ja sogar die anscheinend noch viel einfacheren Aufgabe, aus dem anatomischen Zustand eines gewöhnlichen gemischten Nerven sich ein Bild von der dem Nerven verbliebenen (oder eventuell wieder erworbenen) Functionsfähigkeit zu machen, erscheint auf Grund der derzeitigen Kenntnisse und unter Anwendung der praktisch in Anwendung zu bringenden Untersuchungsmethoden unmöglich.

Dass diese letzteren Schwierigkeiten nicht ganz grundsätzlicher und unüberwindlicher Natur sind, lehren wohl die Untersuchungen *Bethes* über die Structuren der functionierenden Substanz, wenn es auch noch nicht gelungen zu sein scheint, dieselben für die uns beschäftigenden Fragen heranzuziehen. Dass auch, wenn dies gelungen wäre, von da aus noch ein weiter Schritt wäre bis zur Uebertragung der Kenntnisse auf die complicierten Gebilde der Hirnrinde mit ihren mannigfachen Organen mit noch ganz unbekannter Functionsverteilung, bedarf keiner Ausführung; immerhin wäre es schon als grosser Fortschritt zu erachten, wenn es gelänge zunächst in einfacheren Gebilden—wie die oben genannten

Bahnen der weissen Substanz, später auch für compliciertere Gebilde, Teile des Gehirns oder das ganze Gehirn ein Mass für die Menge ausgefallener und functionsunfähiger Substanz einerseits, erhaltener und noch funktionierender anderseits zu finden, und ein Fortschritt nach dieser Richtung erscheint tatsächlich möglich, ohne dass man diese Hoffnung auf die Möglichkeit principiell ganz neuer Untersuchungsmethoden zu gründen braucht.

Nach einer anderen Richtung sind wenigstens einige Kenntnisse und Erfahrungen schon gesammelt: wenn es uns auch, wie oben erörtert, *nicht* möglich ist, auch nur ungefähr, aus dem Grade der Atrophie oder sonstigen Veränderung des Gehirns, ein *absolute*s Mass der entstandenen Functionseinbusse abzuleiten, so können wir doch die Schädigung verschiedener Partien des Gehirns untereinander quantitativ vergleichen, und wir werden bei deutlichen Differenzen daraus ohne allzugroben Fehler auf entsprechende Differenzen in der Störung derjenigen Functionen schliessen dürfen, die den verschiedenen Regionen entsprechen—soweit uns diese Functionen auf Grund anderweitiger Erfahrungen bekannt sind; tatsächlich eröffnet sich uns auf diesem Wege allmählich eine Einsicht in jene Fälle von Demenz, die mit Herdsymptomen gepaart gehen, oder richtiger vielleicht, die verschiedenen Gebiete derartig ungleichmässig betreffen, dass einzelne Ausfälle als Herdsymptome im Sinne der Hirnpathologie sich hervorheben.

Nach Massgabe der gegenwärtig auf grosse Uebersichtsparate anwendbaren Färbemethoden werden wir uns zunächst mit der Feststellung relativ grober Differenzen zu begnügen haben: es ist aber nur eine Frage der vervollkommenen Technik resp. der genügenden Kräfte und Mittel, wann es gelingen wird, auch die feineren Methoden für solche topographische Untersuchungen heranzuziehen und entsprechende Schlüsse auch aus feineren localen Differenzen abzuleiten.

Immerhin werden uns auch noch so erfolgreiche einschlägige Arbeiten nur eine bestimmte Categorie von Differenzen erhellen helfen, die zudem, wie es scheint, nur für einen verhältnismässig geringen Teil aller durch relativ grobe Schädigungen bedingten Demenzformen überhaupt in Betracht kommen, und die bei allem Interesse, das sie mir zu bieten scheinen, doch nicht *die* Rolle spielen, die den eingangs ausführlicher besprochenen Unterschieden zukommt.

Es ist ein Wagnis heute zu der Frage Stellung zu nehmen, ob wir erwarten dürfen, jemals aus dem anatomischen Befunde die qualitativen Differenzen der verschiedenen Demenzformen ableiten zu können, wie nochmals erwähnt sei, nicht in dem Sinne, dass wir aus dem Gesammtbefunde die verschiedenen zur Demenz führenden *Processe* diagnostizieren können, etwa ebenso, wie wir die progressive Paralyse zu diagnostizieren imstande sind, sondern in dem Sinne, dass uns der Befund einen Einblick in das Zustandekommen der einzelnen wechselnden Componenten der Defectzustände eröffnen würde. Dass der weitere Ausbau der groben topographischen Verteilung der Störungen hier weiteren Aufschluss geben wird, etwa im Sinne *Flechsig'scher* Anschauungen, erscheint sehr wenig wahrscheinlich; es bleiben dann zwei Möglichkeiten zu erwägen.

Die eine dieser Möglichkeiten wäre die, dass man gewissermassen senkrecht zu der topographischen Localisation die im wesentlichen im Sinne einer Projection der Körperoberfläche auf die Gehirnrinde geschieht, eine zweite annehmen dürfte, derzufolge *innerhalb* circumscripter, etwa dem Hören, Sehen oder ähnlich umgrenzten Functionen entsprechender Gebiete—bestimmten Elementen bestimmte noch feiner differenzierte Functionen—etwa die Retention, die Association u. ä.—zugeteilt wären. Diese Elemente könnten innerhalb der Hirnrinde zerstreut etwa nur morphologisch differenziert und characterisiert sein, oder sie könnten mit oder ohne solche morphologisch erkennbare Differenzierung bestimmten Partien der Hirnrinde schichtenweise zugeordnet sein. Gerade die letztere Annahme entspräche grundsätzlichen *Wernicke'schen* Anschauungen, der ja, wenn auch mit begreiflicher Vorsicht, die Möglichkeit einer solchen psychologischen Localisation innerhalb umschriebener Hirnrindenpartien erwog. Es muss aber doch anerkannt werden, dass diese Annahme—wenn auch neuerdings sich wieder einschlägige Erwägungen hervorgewagt haben—Hypothese geblieben ist, und dass vor Allem zur Zeit noch nicht die Rede davon sein kann, tatsächlich bestimmte "psychologische" Ausfälle zu Laesonen bestimmter Rindenschichten resp. zu schichtweisen Ausfällen in Beziehung zu setzen.

Die zweite zu erwägende Möglichkeit wäre die, dass die Differenzen durch die *Art* des anatomischen Processes bedingt wären, in dem Sinne, dass dadurch nicht nur der Gesammtverlauf und damit

im Wesentlichen die Rubricierung im System der Psychosen bedingt wäre, sondern derart, dass es tatsächlich gelänge, zwischen den verschiedenen anatomischen Laesonen und den speciellen Erscheinungen Beziehungen herzustellen.

Der Gedanke erscheint mir nicht ganz phantastisch, dass es vielleicht einmal gelingen kann, bestimmte anatomische Veränderungen zu umschreiben, die etwa in besonderer Weise geeignet sind, jene *alten Structuren* zu vernichten, die wir als Grundlage der Erinnerungen annehmen; andere, die etwa dem Neuerwerb solcher Structuren erschweren mögen und wieder andere die eine besondere Labilität und Vergänglichkeit derselben zur Folge haben, oder noch andre, die jene Activierung erschweren, von der wir uns das Arbeiten mit dem einmal erworbenen geistigen Fonds zum Teile wenigstens abhängig denken. Es hat keinen Wert derartige Hypothesen weiter auszuspinnen; denn es muss nachdrücklich anerkannt werden, dass ihnen tatsächliche Erfahrungen zur Zeit noch nicht zu Grunde liegen.

Man wird sogar zugeben dürfen, dass heute selbst zum Aus sprechen derartiger Möglichkeiten mehr Optimismus oder Verwegenheit gehört als etwa vor 20 Jahren, als Wernicke die grundlegende Einleitung zu dem "Grundriss" schrieb, in der er die Auffassung der Geisteskrankheiten als Gehirnkrankheiten wesentlich sich stützend auf die Herderkrankungen im engeren Sinne und die Ausfallssymptome im Besonderen durchzuführen versuchte. Die zweifellose grössere Skepsis in der Frage einer anatomischen *Erklärung* psychischer Störungen ist zum Teil wohl darauf zurückzuführen, dass sich auch viele Hoffnungen bezüglich der Erklärung reiner Herderscheinungen, namentlich bezüglich der feineren Localisation, nicht in dem Masse erfüllt haben, wie man nach den glänzenden Anfangsleistungen erwarten möchte; zum Teil entspricht die veränderte Stellung dem Umschwung all' unserer Auffassungen vom psychischen Geschehen, wie er sich mit zunehmender Deutlichkeit in den letzten Jahren vollzieht und dessen Wurzeln nachzugehen nicht ausschliesslich, ja nicht einmal in erster Linie Aufgabe des Psychiaters ist.

Es kann verständlich erscheinen, wenn sich unter diesen Umständen eine gewisse Skepsis und Resignation geltend zu machen droht, wenn das Interesse an der eigentlichen klinischen Psychiatrie wieder zu erlahmen droht, und die zu ihrer Pflege Berufenen

sich neuerdings wieder mit Vorliebe **Nachbargebieten zuwenden**.

Ich glaube nicht, dass diese Resignation berechtigt ist: allerdings auch auf dem engbegrenzten Gebiete, das wir flüchtig eben zu übersehen versuchten, mussten viele Lücken gezeigt werden und darunter manche, deren Anfüllung in absehbarer Zeit nicht zu erwarten steht; daneben aber konnten zahlreiche Fragen gestellt werden, deren Beantwortung mit den uns zur Verfügung stehenden Mitteln denkbar ist.

So lange das der Fall ist, hat die Wissenschaft keinen Grund zur Resignation; ich schliesse mit dem aufrichtigen Wunsche, dass es auch dem Institute, dessen Eröffnung wir feiern, gegeben sei, an der Lösung dieser Fragen mit Erfolg mitzuarbeiten.

#### ABSTRACT.

The dementia problem deserves being discussed with a strictly scientific consideration, free of all compromises with practical needs. The term "dementia" is preferably reserved to defects which are not accessible to restitution. How difficult that is is shown by the protracted climacteric and anxiety depressions, in which the really temporary defect-phenomena have been taken prematurely as permanent. But it is not excluded that the same process which at one time has caused a deficit open to restitution might not possibly lead later to a lasting damage in the same individual; and it may be that the processes which are at the bottom of the acute symptoms may go parallel with the processes which cause the defect and that these latter processes, after the recovery from the acute disorder, may remain stationary or even go further, as for instance, in general paralysis (Schroeder). Presbyophrenic conditions (not qualified as dementia by Wernicke) following an acute infection or an acute vascular disturbance or even a break in the general circulation, may first be capable of total restitution, but may recur with the same kind of damage and become less and less or finally not at all capable of restitution; the same holds for Korsakow's psychosis, and decidedly for epilepsy, the lasting condition of which can to a certain extent be recognized as a sum of the residuals of the successive acute stages. A similar condition pertains in general paralysis where the restitution becomes progressively less complete. This fact may open the road to a brain-pathological interpretation of psychoses.

Far greater is the difficulty of the question of what kind and what extent the deficit of function must be to constitute a dementia in a scientific sense of the word. Didactic usage does not speak of a unitary dementia with mere quantitative differences, but of paralytic, senile, arteriosclerotic, hebephrenic and epileptic dementia. In doing so we do not, of course, specify the dementia, but its foundation.

Heilbronner then turns to the problem of a possible central factor in intelligence (Krueger and Spearman) which might be made accessible to measurement. Such a factor has been determined (not, however, including the learning by heart, which, as we know, can be high in an idiot) clinching the standard of many simpler reactions; but this central factor is still far from "the intelligence" in its higher sense. Neither for intelligence nor for dementia are we likely to evolve unitary concepts or measures which would allow us to limit our determinations to merely one central factor; nevertheless attempts of this kind have been made by Foerster and Gregor in general paralysis. In paranoia and dementia praecox it will always be questionable whether the existence of deficits of judgment or actual defects should be laid to a "dementia," and paralytic defects differ from the defects in epilepsy; the profound retention defects in presbyophrenia do not occur in epilepsy and are late in general paralysis; dementia praecox differs from idiocy, etc.; there always remains the question whether the deficits demonstrated by the various measures of dementia really constitute what we should call the *essence* of the dementia. Penon found old circular cases with much poorer results than are often obtained in dementia praecox, although the appearance of the patient suggests far less dementia. Discussions of what this essence consists in and whether it is a unitary and finally characteristic deficit, a true dementia, would not promise much. Even what is an excusable defect of knowledge compatible with normality is a hazy question since the study of Prussian recruits by Rodenwaldt.

Binet tries to eliminate the acquisitions from mere school drill; but the application of the tests to the adult is still an open problem. To use success in general as a criterion of intelligence might also suggest many difficulties in deciding as to what we shall accept as sufficient success.

A similar difficulty exists in the attempts to measure disorders of *consciousness* by the subsequent amnesia. By too liberal a use of this criterion epilepsy has been extended beyond excusable bounds. Studies of epileptics, typhoid cases and patients with commotio cerebri show the difficulty of trying to understand the disorder of sensorium out of the individual elementary defects. Altogether it seems more likely that dementia is the result of summation of various components, rather than the varying consequence of one unitary fundamental disorder.

Passing to the anatomical foundation of dementia, Heilbronner refers first to the modern tendency to claim that all psychoses with anatomically demonstrable foundation must lead to dementia, and that in all the others a search for pathological-anatomical changes must necessarily meet with negative results. Anatomically valuable differentiations have been established especially by Nissl and Alzheimer in the organic dementias and even in idiocy. These are more easily diagnosed from neurological symptoms than from the distinctions of the dementia. Even the parallelism between the quantitative extent of the lesion and the degree of dementia is beyond more than approximate estimates. An identification of special psychological defects with defects of special cortex-layers is even more problem-

matic, notwithstanding the attractiveness of pertinent hypotheses. An attempt like Wernicke's, that of wanting to present the mental disorders as brain diseases of special localization, certainly meets with more skepticism to-day than 20 years ago.

In closing the speaker expresses the hope that the new institute may collaborate successfully in the solution of the questions touched.

## THE INTER-RELATION OF THE BIOGENETIC PSYCHOSES.\*

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Whether the worker be actuated primarily by therapeutic motives or by the desire to increase scientific knowledge it is in either case impossible for him to carry out any detailed explorations in the mental processes of his patients without acquiring as a result some notions, however tentative, regarding the distinctions between the various types of disorders with which he has to deal. Those who have used in their investigations the most thorough of the psychological methods, I refer to the psycho-analytical school inaugurated by Freud, have, it is true, chiefly devoted their attention to the numerous problems of individual psychopathology, and have not for the most part displayed any very special interest in the not always profitable questions with which nosology is mainly concerned. Nevertheless, in the course of years, and, one might almost say, automatically, certain general conceptions of a nosological character have gradually crystallized out from their work, some of which I desire to bring now before the notice of this gathering. I do so at the request of Dr. Adolf Meyer, than whom no one knows better how tentative and fragmentary such a contribution must necessarily be.

As the greater part of psycho-analytical work has been done in connection with the neuroses, it is natural that here the greatest progress has been made, and indeed it may be said that in this field our nosological conceptions are approaching a stage of completion. It has been found that the two main types of neurosis, the obsessional neurosis (*Zwangsnurose*) and hysteria, present clear distinctions in their essential nature and in their psychological mechanisms, so that it is now nearly always possible not only to separate them in general, but also to estimate in a mixed case how much of the content belongs to the one condition and how much to

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the other.<sup>1</sup> With regard to the large group of symptoms, such as most of the phobias, various vaso-motor manifestations, and so on, that have traditionally been considered to form part of hysteria, but which Babinski and others have in recent years attempted to split off from this, psycho-analysis has shown that they are in their nature so closely allied to hysteria as to make it preferable still to include them under this term; according to psycho-analysis, therefore, hysteria is held to cover at least as wide a field as it ever did. The progress made in the more obscure problem of classifying the various anxiety states (*Angstzustände*) has been slower, as might have been expected, but even here a considerable degree of insight has been attained in recognizing the distinctions and resemblances between these states, and we are now in a position at least to formulate the problem in a more satisfactory way than was previously possible.<sup>2</sup>

In the field of the psychoses proper (the relatively small group of "organic" psychoses, such as general paralysis of the insane, arterio-sclerotic insanity and the like, are here excluded) less has been accomplished, but still something. Light has been thrown both on the distinctions and inter-relations between several of the individual psychoses and on the relation of the neuroses to the psychoses in general. The first step was the demonstration, by Jung, Abraham, Bleuler, and others,<sup>3</sup> that the commonest psychosis, dementia praecox (Bleuler's *Schizophrenie*, or, to use the more recent term of Freud's, *Paraphrenia*), exhibits unconscious psychogenetic mechanisms akin to those met with in the neuroses, and that the disease manifestations represent an introversion of interest accompanying a regression of mental processes towards a more infantile type, one aptly described by Bleuler under the expression "autism." Some two years ago Freud published a study of paranoia,<sup>4</sup> which from the point of view of nosology

<sup>1</sup> See Freud: *Jahrbuch f. psychoanalytische Forschungen*, Bd. I, or in default of this Hitschmann, "Freud's Theories of the Neuroses," Engl. Transl. by Payne, 1913, Chapters VI and VII.

<sup>2</sup> See Ernest Jones: *Papers on Psycho-Analysis*, 1912, Ch. VIII, "The Pathology of Morbid Anxiety," and "The Relation between the Anxiety Neurosis and Anxiety-Hysteria," *Journal of Abnormal Psychology*, April, 1913.

<sup>3</sup> These works are reviewed in the number of the *Jahrbuch* already referred to.

<sup>4</sup> Freud. *Jahrbuch*, Bd. III, S. I.

alone is of remarkable interest. In it he showed that the close connection clinically known to obtain between **paranoia, dementia paranoides, and paraphrenia**, has its exact counterpart in the psychological basis of these three conditions. They represent, namely, in this order an increasing regression towards more and more primitive stages of ontogenetic development, each corresponding with what may be called a caricature of a phase of growth through which every individual has to pass; we have here, therefore, a psychological explanation of the familiar clinical finding that the same case which at its onset appeared to be one of simple paranoia may later pass through the stage of dementia paranoides and terminate in a frank dementia. From this point of view one would be inclined to regard the type of "pure" paranoia that does not go on to dementia as not differing essentially from paraphrenia, and, as representing merely a milder form of a very similar disease process, a conclusion already reached on clinical grounds by a number of psychiatrists. The differences that these three conditions show in extent of regression will in the future no doubt be correlated with variations in the original mental disposition of the individual, and may perhaps also be described in terms of racial atavism.

We are not yet in a position profitably to discuss the causes of the differences between the neuroses and the psychoses, but the preliminary task has been entered on of defining wherein these differences reside. The most satisfactory formulation of them at present possible would seem to be this: that the introversion or turning away of interest from the outer world, which is the most characteristic feature of both, has proceeded to a farther degree in the case of the psychoses, carrying with a loss, absolute or relative, of the "feeling for reality (Janet's *sentiment du réel*, Freud's *Realitätsgefühl*). Even here, however, the difference would seem to be one of degree rather than of kind, for, on the one hand, the feeling for reality is generally retained to some extent in most cases of psychosis, while, on the other, it is always partly abrogated in every case of neurosis and occasionally for a short time altogether; from this hint one might surmise that possibly the distinction between the two groups is less sharp than is usually thought. This consideration goes to render more intelligible the curious association of neurotic and psychotic mani-

festations so often found existing in the same case, the classical example of which is the frequent combination of hysterical and catatonic symptoms. From a psychological, as well as from a clinical point of view, it may be said that in such cases the hysterical product covers the catatonic one. What has happened is that the reaction of the individual towards various psychical conflicts, which he cannot resolve, has led first to the creation of hysterical symptoms, and then, these failing in their function of a defence mechanism, to a further degree of introversion, culminating in catatonia. It should not be forgotten in this connection that symptoms of mental disorder are very properly so called; they never make up the disorder in themselves, but are only symptomatic of it. Indeed, it is psychologically more accurate to regard them not so much as direct signs of the disease itself as evidences of desperate attempts to remedy it; they indicate the action of protective processes rather than of destructive ones.

Physical symptoms of hysteria ("conversion hysteria") are not the only neurotic manifestations that may conceal a more serious state of affairs. Occasionally, and this is not so widely known as it should be, hysterical phobias ("anxiety hysteria") may also play the same part. Cases even occur of absolutely typical anxiety-hysteria where, after the phobias are made to disappear by treatment, paraphrenic manifestations, particularly of the paranoid variety, show themselves for the first time, almost giving the impression that the neurosis had in a way served to protect the person from the necessity of erecting a second line of defence, paraphrenia, until it was removed. We know that there are patients who are not strong enough to live without their protecting neurosis, and the development of a paraphrenia is one of the calamities that may occur when it is taken away. Cases of this sort are fortunately very rare, but they are the source of much anxiety to the physician responsible for the care of them, so that the matter is one deserving of special attention. Then, again, epileptiform attacks of psychogenic origin, clinically indistinguishable from true epileptic fits, may also occur as a cover-syndrome, and quite apart from the familiar paraphrenic epileptiform seizures, the origin of which is as yet not known. The obsessional neurosis may at times be exceedingly difficult to distinguish from paranoid conditions, and, though I have never seen a clear case

of the kind, one could readily imagine the two being combined in the same way that hysteria and catatonia so often are.

One of the most interesting nosological questions of present-day psychiatry is that concerning the status of manic-depressive insanity. As is well known, Kræpelin's gradual extension of the conception during the past six or eight years has been effected mainly at the expense of the paraphrenic group, the first step in this direction having been taken by recognizing that catalepsy and other catatonic symptoms might also occur in manic-depressive insanity; even the appearance of a considerable terminal deterioration is now held not necessarily to exclude this diagnosis. A striking result of this tendency has been an increasing difficulty in establishing a demarcation between the two groups, the endeavor being accompanied by a certain artificiality and an undeniable arbitrariness. Although Kræpelin himself still maintains that the two conditions are fundamentally distinct from each other in their nature, there are not wanting psychiatrists, and even in his own school, who are beginning to doubt this, and who regard the difficulty of separating them clinically as indicating that an essential connection subsists between them. An interesting example of this trend is furnished by Urstein's recent work,<sup>4</sup> in which the conclusion is reached that manic-depressive insanity is to be regarded as a syndrome of catatonia.

Psycho-analytic investigations of this condition have as yet been too sparse to allow of more than fragmentary contributions being made to the nosological problem, but, in the light of the considerations just mentioned, these possess a certain interest. In the first place, as confirming the doubts that have elsewhere been cast on the available clinical criteria, it has been shown by Brill<sup>5</sup> that cases occur, clinically indistinguishable from manic-depressive insanity, but which prove on psycho-analysis to be of the nature of anxiety-hysteria. In rare instances this has also been my own experience. There comes to my mind, particularly, the case of a male patient, kindly sent to me by Dr. Adolf Meyer, where the diagnosis of manic-depressive insanity had been made by Kræpelin himself and several other psychiatrists. Clinically,

<sup>4</sup> Urstein: *Das manisch-depressives Irresein als Erscheinungsform der Katatonie.* 1912.

<sup>5</sup> Brill: *Psychanalysis.* 1912. Ch. III. "The Actual Neuroses."

it was a typical case of cyclothymia, of the depressive variety, extending over the greater part of the patient's life, but both the psycho-analysis and the subsequent course of the case showed that it was beyond doubt one of anxiety-hysteria. Such cases must, of course, be separated from the true manic-depressive group, but I know of no way in which this can be done at present except through psycho-analysis. As regards the true variety, Abraham<sup>7</sup> has, in a recent paper, drawn a striking analogy between the psychological structure of the manic-depressive syndrome and that of the obsessional neurosis, while, in a case reported some four years ago,<sup>8</sup> I called attention to the presence of psychogenetic mechanisms similar to those met with in paraphrenia. Much more work needs to be done before any definite conclusions can be formulated from the psycho-analytic point of view as to the nosological status of manic-depressive insanity, but I have little hesitation in hazarding the opinion, on general principles, that the relation between it and paraphrenia will be found to be of the same nature as that subsisting between hysteria and paraphrenia; in other words, that the two conditions represent merely different stages and varieties of a profound introversion rather than two entirely distinct disease processes. It is further probable, to my mind, that manic-depressive insanity, with perhaps other conditions, notably certain of the epilepsies, may profitably be regarded as representing intermediary stages, so far as the extent of the introversion is concerned, between the neuroses and paraphrenia. In any case, it seems to show a number of links connecting it in both directions. On the one side we see that its psychological structure can be closely paralleled by that of the obsessional neurosis and that a perfectly typical manic-depressive syndrome may occur in anxiety hysteria, while, on the other side, the resemblances it bears to paraphrenia are only too familiar to the diagnostician; the intimate associations between it and catatonia are emphasized by Urstein, being, indeed, a direct result of Kræpelin's redistribution, itself the inevitable product of faithful observation, and, on the other hand, the prominence of paranoid

<sup>7</sup> Abraham: "Ansätze zur psychoanalytischen Erforschung und Behandlung des manisch-depressiven Irreseins," *Zentralbl. f. Psychoanalyse*, Jahrg. II, 1912.

<sup>8</sup> "Psycho-Analytic Notes on a Case of Hypomania," *American Journal of Insanity*, Oct., 1909.

delusions in so many cases has actually led some psychiatrists, notably Specht,<sup>\*</sup> to advance the astonishing proposition that the greater part of the paranoia group should be included under it, a fact which at all events indicates that the transition of such cases to dementia paranoïdes would be less violent than might at first sight be imagined.

I must frankly confess that the train of thought on which these views are based constitutes to a great extent a reversion to an older attitude, discarded by most recent psychiatrists, one which, being opposed to any form of faculty psychology, lays stress on the features common to all varieties of psychogenetic disorders. One holds, in short, that in this field we have to deal with various types of reaction to a fundamentally allied group of difficulties, namely, intrapsychical conflicts of a biological nature, rather than with a number of entirely distinct "disease entities." This attitude towards the problems of nosological psychopathology is in full accord with the tendency advocated by our distinguished host, Dr. Adolf Meyer, who has constantly urged that we should study our patients from a broader point of view and regard them as biological organisms striving to remedy their maladjustments. It is true that this attitude in no way relieves us from the necessity of trying to define the different types of reaction that we encounter, a matter that is evidently of cardinal importance for both prognosis and therapeutics, and I would only add in conclusion that even in this field of diagnosis alone the services rendered by psycho-analysis are not to be underestimated.

\* Specht: "Ueber die klinische Kardinalfrage der Paranoia." *Zentralblatt für Nervenheilkunde und Psychiatrie.* 1908.



## PROGNOSTIC PRINCIPLES IN THE BIOGENETIC PSYCHOSES, WITH SPECIAL REFERENCE TO THE CATATONIC SYNDROME.\*

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At the present time two widely divergent views are held regarding the probable nature of the so-called functional psychoses, and, as would be expected, equally opposing views are entertained regarding the prognostic principles which underlie these disorders.

The first standpoint, that of the Kraepelinian school, is the outgrowth of an attempt to make use of symptoms of prognostic value in the formation of clinical groups. Reasoning from what he found to be the outcome in psychoses, Kraepelin taught that a sufficiently keen analysis of clinical pictures permitted one to identify in the early stages of the disorders certain symptoms or groups of symptoms which indicated either a good or bad prognosis, and thus one could differentiate two types of psychosis, manic-depressive insanity, a recoverable form, and dementia praecox, a deteriorating form.

Kraepelin went further and maintained that we had to do here with two different and distinct *disease processes*, although in neither instance was the cause or nature of the disease known, and least of all were definite anatomical changes demonstrable.

Much of the criticism that Kraepelin later encountered was reasonably grounded and expressed the clinical experience that while the symptomatological distinctions which he put forth allowed a considerable number of cases to be prognostically grouped, yet numerous other cases did not yield to any such differentiation. In some cases there appeared to be puzzling combinations of symptoms of supposedly diagnostic value; in others deterioration seemed imminent or even established, yet recovery took place; many benign

\* Address delivered at the opening exercises of the Henry Phipps Psychiatric Clinic, The Johns Hopkins Hospital, Baltimore, Md., April 16-18, 1913.

and recurrent psychoses could not be harmonized with the manic-depressive formula.

Kraepelin's own inability to successfully circumscribe the two groups in question is clearly seen from the diagnoses made annually in his own clinic. We find, for instance, dementia *præcox* rising to 52 per cent of the admissions, and then falling back to 18 per cent—manic-depressive naturally swung in the opposite direction.<sup>1</sup> An investigation into the subsequent course of 468 cases diagnosed by Kraepelin as dementia *præcox* led to the conclusion that 29 per cent of these were really manic-depressive cases (Zendig). In Zürich Bleuler looks upon 30 per cent of the admissions as dementia *præcox*;<sup>2</sup> at Ward's Island we place about 12 per cent in this group,<sup>3</sup> while in Munich Kraepelin considered in 1909 only about 7 per cent to be cases of dementia *præcox*.<sup>4</sup>

All these facts prove that at least very great practical difficulties are encountered when one tries to differentiate the psychoses by the Kraepelinian method; serious doubts have arisen in the minds of many as to the validity of the distinctions put forward, and it is questioned whether or not one is justified to speak of definite diseases with fixed course and outcome. It will be conceded that prognostic studies so far made can have little real value when the clinical groups are so vaguely defined.

In opposition to Kraepelin's disease process doctrine and claim that a correct diagnosis practically settled the prognosis, Prof. Meyer formulated a conception which has furnished us with many new and fruitful viewpoints; the importance of factors overlooked or ignored in the former hypothesis has been demonstrated and the whole question of prognosis has been put on an entirely different basis. This conception rests on a psychobiological interpretation of these psychoses and emphasizes the importance of psychological events as factors of dynamic value. When one takes into consideration the various forces at work in the life histories of cases and uses them in chains of cause and effect, then these disorders become more and more understandable as biological reactions of the mental type, the psychosis expressing a defective biological adaptation of the individual. This conception makes it unnecessary to assume that the outcome is determined by the kind or severity of an unknown disease process, but rather that the course of events and the termination are accounted for by the dynamic

forces at work in an individual life and by the type of reaction itself, some mental reactions being biologically unfavorable for return to normal attitudes, while others are less so.\*

In the purest forms of the manic-depressive reaction type we have a disorder expressed chiefly as an emotional deviation and understandable largely as an exaggeration or diminution of conditions belonging to our normal life. The symptomatology of the typical attack, with the swings in mood, the thinking disorder and psychomotor disturbance, is remarkably free from features which are not apparently open to correction later on; hence both the foundation and type of reaction imply a good prognosis.

In dementia praecox, on the other hand, the psychosis appears to be the outgrowth of a long-continued period of unhealthy biological adjustments on the part of the individual. Prof. Meyer was the first to show how clear indications of tendencies toward defective adaptation could so often be recognized long before the obvious mental breakdown, in many cases even very early in life. The personalities which develop dementia praecox show too often to be disregarded early deficiencies in the instinctive life, faulty mental habits, inefficient application to reality, seclusiveness, peculiar judgment defects and drifting away from concrete interests, tendencies which, if unchecked, lead quite naturally to disastrous results. In the psychosis itself, when analysis is possible, we find abundant evidence that bad mental habits, inadequate dealing with complexes and conflicts particularly in the sexual sphere, failure of healthy interests and exclusion of normal thinking, have eventually undermined the personality and brought about the mental dilapidation. It would be surprising if the organic substructure of mental life, the brain, did not also suffer.

We are now sufficiently well acquainted with a few biological reaction types to use them as prognostic guides; these types do not, however, always occur in clear-cut and easily distinguishable form. There are apparently a number of types as yet poorly defined, and also various transition forms probably exist, so that the formulation of a rational prognosis always requires a careful weighing of the different factors entering into the individual case. This is what a psychobiological interpretation encourages, and puts emphasis on the possibility of dynamic factors being modified for the better or the worse. It seems to us very improbable that

general prognostic principles, such as Kraepelin brought forward, can ever be applied to large groups of biogenetic psychoses, such as we have been attempting to make. The whole biological conception of the development of these psychoses is against this possibility.

When one reviews a series of well worked up cases one cannot escape the conviction that, when we get away from the characteristic foundation and evolution of dementia praecox, then the so-called diagnostic symptoms and signs lose most of their prognostic meaning. As a contribution to our knowledge of the prognostic value of a symptom group, I wish to report the result of our observations on the so-called catatonic syndrome. It appears to us that this group of symptoms lends itself particularly well to the elucidation of some of the prognostic principles just discussed.

As is well known, Kraepelin claimed for his dementia praecox group practically all non-organic cases with catatonic symptoms, and looked upon these manifestations as especially significant of a deterioration process. Within the dementia praecox group itself the catatonic cases have appeared, however, to hold a rather special position, as acknowledged by Kraepelin himself. In these cases the onset is apt to be more abrupt, the course more irregular, and the tendency to remissions greater than in the other forms of dementia praecox. Furthermore, the number of cases that may be looked upon as recovered is considerably higher than in the other types of dementia praecox. Kraepelin admits that about 13 per cent of his catatonic cases appear to recover, but he feels that 'the permanency of these recoveries is not yet settled, and inclines to the view that they are probably only remissions.' Other observers give widely varying opinions as to the prognosis in this group, some holding that no cases recover completely, others that 20 to 25 per cent recover. Wilmans, in a review of Kraepelin's own Heidelberg cases, comes to the conclusion that catatonic symptoms as evidence of a deterioration process were greatly overvalued, as the later histories of numerous cases have proven that recovery took place.'

The catatonic syndrome is not in any sense a clinical unit, and it is not to be doubted that under this designation cases have been brought together which have only a superficial resemblance. Very marked catatonic symptoms unquestionably occur in conditions

other than dementia *præcox*. The clearly organic psychoses may give symptoms which resemble in a most striking manner the catatonic pictures seen in dementia *præcox*. We also know that very pronounced catatonic symptoms may occur in infective-exhaustive psychoses.<sup>8</sup> It is quite probable that deteriorating and non-deteriorating catatonic cases represent fundamentally different reaction types, but our knowledge of what these differences are remains very imperfect.

No satisfactory explanation has been found to account for the origin of these peculiar symptoms, and we know almost nothing of their deeper meaning and the mechanisms involved in their development. According to Kraepelin the negativism depends on a peculiar primary will disturbance leading to unexplained blocking of impulses or checking of them by contrary impulses. Bleuler, in a masterly analysis of negativistic phenomena, has shown the complicated nature of these manifestations and their dependence on a number of factors not considered in Kraepelin's hypothesis.<sup>9</sup> Psycho-analysis has not thrown much light on the genesis of catatonic symptoms. The most typical catatonic manifestation, the negativistic stupor, has the general characteristics of a defense reaction or of a protective mechanism, whereby the individual practically shuts out the external world.

On the other hand, we know that many forms of aversion cannot always be separated from catatonic negativism. Much so-called negativism is, when analyzed, found to be understandable as a more or less consciously assumed attitude toward an unpleasant emotional situation. We find states of obstinacy and irritability simulating negativism, and a hostile interpretation of the environment cannot be sharply differentiated from negativism, because a hostile attitude toward the outer world forms one of the roots of negativism. In cases where the sensorium is somewhat clouded, or when there is a great degree of perplexity or severe retardation, the behavior of the patient may appear markedly negativistic and make differentiation by means of symptoms alone quite impossible.

The clinical material used in the present study consists of 80 cases, most of which were observed on the service of Prof. Meyer at the Psychiatric Institute on Ward's Island. Some additional material has been drawn from the Manhattan State Hospital. We have, of course, excluded all organic cases, also the epileptic and

hysterical cases. In order to define the group as sharply as possible only those cases have been included which showed a well-marked stupor with negativism, muscular tension and usually catalepsy, or exhibited states of excitement or depression accompanied by stereotypy of speech and action and usually impulsive behavior.

In interpreting the course and outcome we have not considered recovery established in any case unless it is shown that insight has been acquired, that energy and interests have not suffered, and that two years have elapsed since the psychosis subsided.

The cases studied have been divided into three groups, each of which will be briefly referred to:

(1) *Catatonic Psychoses Associated with Deterioration*.—We find in these cases that the appearance of a definite catatonic reaction, stupor or excitement, has been preceded, with very few exceptions, by symptoms indicative of a gradual change in the personality. Accurate anamneses show this so clearly and consistently that it appears to us extremely doubtful if these deteriorating catatonic states ever set in abruptly without ominous prodromes. One must not overlook the fact that in many cases the actual period of transformation from the normal can be learned only from the patient, hence anamneses which give an account of an abrupt onset should be cautiously accepted unless corroborated by the patient.

As occupying a special position in this group one must mention the puerperal cases. Two patients in the series deteriorated after what appeared to be a sudden onset following childbirth—both were catatonic-like excitements from the first. Neither ever became accessible for examination.

(2) *Psychoses Essentially Catatonic Throughout, but Ending in Recovery*.—Most of the cases grouped here are catatonic stupors or depressions with catatonic behavior. In a number of cases the duration was two years or over, so that recovery came more or less as a surprise.

An instructive case was that of a married woman 31 years old. She was bright and smart; never considered peculiar. The onset of the psychosis was sudden, two days after the death of a three months old baby. For 5½ years the patient showed in the hospital a very typical catatonic picture. There were mutism, general resistance against passive movement, muscular tension, fixed pos-

tures, hands clenched, head flexed, chin on the chest, steady gazing and at times catalepsy. For several years the patient was regarded as a deteriorated catatonic. The clearing up was gradual with complaints that she felt dazed, that her memory was poor, her head dizzy. She convalesced steadily and was discharged as recovered 6½ years after admission.

The retrospective account showed that the patient had little recollection for the stupor period, the lapse of memory beginning with the funeral of her baby and covering most of the succeeding six years. The patient left the hospital with complete insight, returned to her domestic duties and has been in all respects as bright and efficient as before the attack. She has borne two healthy children, and at the present time, five years after her release from the hospital, there is no reason to doubt her complete recovery.

In this case there was nothing in the patient's make-up or in the development of the psychosis to suggest deterioration, but the symptom-picture and the long duration led to an erroneous conclusion.

Analysis of the stuporous cases permits us to say that when the psychosis is expressed exclusively or chiefly in an acute stuporous reaction the prognosis is good. In the unfavorable cases the catatonic signs are in the beginning most often of the nature of odd behavior, grimacing and stereotypies followed by the gradual establishment of a stuporous condition with negativism and fixed postures.

(3) *Psychoses Presenting Besides Catatonic Symptoms Manic-Depressive Features.*—Many cases in this group were wrongly judged to be deteriorating types because of the over-valuation of catatonic manifestations. Of particular interest is the appearance in the same individual, at different times, of a clear manic-depressive symptom-picture and a typical catatonic syndrome. Many of our cases show that this occurs and it would appear that a very characteristic catatonic phase may replace the depression in a circular attack. A good example is the following case:

A bright and industrious girl of 18 developed a psychosis rapidly within three weeks before admission to the hospital. The patient was shocked by receiving a false report of her father's death. An excitement followed which was typically manic and lasted for a

month, then the patient passed into a perfectly characteristic catatonic stupor. She was mute, refused food, kept her eyes closed; held saliva in her mouth, showed general resistance and muscular tension. The muscular rigidity was often extreme. The fingers were clenched and the lips puckered. By placing a hand under the back of her head the whole body could be raised from the bed while she rested rigidly on the heels alone. Peculiar behavior of various kinds was noted, *e. g.*, at times she would hold her breath until blue in the face, then finally expelling the air she would take in a breath with a loud gasp, repeating this for many hours.

The stupor lasted for six months; then rather abruptly a typical manic excitement again developed. The patient was then exalted, playful and erotic; flights, rhymes and sound associations were produced with extreme distractibility and marked restlessness. Having in mind the fact that the patient had shown such a pronounced catatonic phase, we scrutinized this excitement closely, but could see nothing in it suggestive of a catatonic disturbance. The patient was always in close contact with her environment, the activity was free and unrestrained, there were no signs of stereotypy in speech or behavior and nothing to suggest hallucinations.

This excitement lasted about two months; then the patient made a rapid recovery and was discharged with good insight about 11 months after the onset of the psychosis.

The review of the psychosis showed that the patient had a good memory for the period of stupor. She knew the names of all those who had attended her and recalled many minor incidents of that period. The only explanation for her negativistic behavior was that she was depressed over her rather unpleasant home life and wished to die. No hallucinations or delusions established retrospectively. After leaving the hospital the patient resumed her occupation and at present,  $5\frac{1}{2}$  years after discharge, she remains well.

Various other clinical types were observed among these recoverable cases. Retarded depressions with superimposed catatonic symptoms were usually looked upon as dementia praecox. Other cases showed a peculiar intermingling of symptoms corresponding to the so-called mixed manic-depressive conditions.

To summarize the outstanding facts of our review of the catatonic group we may say that in a good many cases erroneous forecasts have been given, as proven by the subsequent history of the patients. From the point of view of formal symptomatology very similar clinical pictures occur in deteriorating and non-deteriorating forms. The most reliable prognostic data are gained from a study of the constitutional tendencies and the mode of development of the psychosis. When the anamnesis reveals a gradual change in the personality with indictions of that type of defective biological adaptation which we are coming to look upon more and more as the foundation for dementia *præcox*, then the prognosis is bad.

Acute stupors developing without characteristic prodromes have a good outlook, although the attack may be severe and of long duration. The puerperal catatonic reactions seem to occupy a special position, as some apparently acutely developing cases run an unfavorable course. We have also shown that catatonic syndromes appear in individuals who otherwise have typical manic-depressive attacks. In cases showing both phases the manic-depressive features carry the greater prognostic significance.

Kraepelin's work stands as one of the most important contributions in the history of psychiatry and few will deny the great value of the generalizations which led to the formation of the manic-depressive and dementia *præcox* groups. The contention, however, that we deal here with two entirely distinct diseases, always expressed in characteristic and distinguishable symptom pictures and having a definite course and termination, has become more and more untenable. By paying attention to factors which Kraepelin ignored or sacrificed to the disease process idea, a psychobiological interpretation of these disorders is found to be possible. This conception has led our interest away from the rigid symptomatological distinctions which in so many cases seems anyhow impossible to make; it teaches us to look for the deeper causes which lie back of symptoms, to study fundamental biological types of reaction, and to recognize the importance of mental events as forces of dynamic value in the psychoses. This conception also puts before us the possibility of modifying the dynamic factors in given cases, and above all it imposes upon us the necessity of considering these factors in our reasoning about prognosis, which must always be formulated for the individual case.

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## ANATOMICAL BORDERLINE BETWEEN THE SO-CALLED SYPHILITIC AND METASYPHILITIC DISORDERS IN THE BRAIN AND SPINAL CORD.\*

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In discussing the anatomical borderline between the so-called syphilitic and metasyphilitic disorders in the brain and spinal cord we take it for granted, on grounds of anamnesis, serum reactions, and postmortem findings, that without syphilis acquired or hereditary these so-called metasyphilitic disorders (general paralysis and tabes dorsalis) would not exist.<sup>1</sup>

Most of us probably would agree, and justly so, that general paralysis and cerebral syphilis, speaking broadly, form two separate and distinct anatomical groups. The histological differences between them have been repeatedly pointed out, especially by Alzheimer, Nissl, and others, but the close anatomical kinship existing between some of the syphilitic and so-called metasyphilitic processes has been little emphasized. This kinship is seen where the two anatomical pictures, usually distinct enough, approach each other; where histology begins to fail in the attempt to draw sharp lines, and where clinical differentiation is equally uncertain. Cases illustrating this anatomical borderland are not very numerous, but their significance seems to me to be large.

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<sup>1</sup> Histories in both the syphilitic and metasyphilitic cases may be negative concerning a primary infection, just as in undoubted tertiary syphilis there is frequently no history of any primary infection. The studies, especially of Mattauschek and Pilcz among officers in the Austrian army who had had syphilis, show that about 5 per cent of the latter developed general paralysis, and in many of those who became general paralytics the antecedent syphilis had been particularly mild, with slight or absent secondaries; in other words, in a less intelligent or less well-observed class of cases the signs of syphilis might easily have been overlooked. It would therefore be remarkable if one did not often fail to establish previous syphilitic infection in a late-appearing disease, such as general paralysis, especially as data from the patients themselves are notoriously untrustworthy.

A review of the well-known forms of cerebral syphilis is hardly necessary. The gummatous form (by far the rarest in our experience) almost always shows, besides the gummatous, the characteristics of the meningeal form, namely, a lymphoid and plasma cell meningitis and a syphilitic endarteritis. The vascular form shows in the foreground syphilitic endarteritis, accompanied as a rule by a more or less scattered and patchy meningitis. It is plain, therefore, that these three forms of cerebral syphilis shade into one another with no clear boundaries, meningitis and endarteritis—with few exceptions—being common to all (Plate VIII, Fig. 2).

In all these forms of cerebral syphilis, especially in the cerebral and cerebellar hemispheres, the inflammatory elements, which consist mainly of lymphoid cells and plasma cells, are either essentially confined to the membranes of the brain as a meningitis, or they may extend inwards by direct continuity for some distance along the adventitial sheaths of those blood vessels which enter the nervous tissues, especially in regions where cellular exudates are densest; but the cells of the deeper exudates, if such exist, are obviously due to extensions from the meninges, and these cells become rapidly fewer as one goes towards the deeper layers of the cortex; *i. e.*, exudates in the cortex, independent of those in the meninges, are seldom evident in the typical cases. If the meningitis is locally very intense the subjacent extensions into the cortex may be abundant, but the connection of the deeper exudate with that in the meninges is nevertheless still plain.

In the brain stem and spinal cord of cerebral syphilis, just as in the hemispheres, a meningitis with extensions inward is also the rule, but besides these extensions the deep-lying vessels usually show an exudate—as a rule a scanty one—apparently independent of that in the meninges; this is important, for this distribution of the exudate in the brain stem and spinal cord of brain syphilis seems not to differ essentially from that found in the brain stem and spinal cord of general paralysis as described later (see Plates I-III, which show a comparison of the two conditions in the lumbar and cervical region of the cord, and in the medulla oblongata respectively). This brief characterization *en masse* of the syphilitic group reveals therefore one striking resemblance between it and general paralysis as seen in the condition of the brain stem and spinal cord.

The brain in general paralysis, as in cerebral syphilis, shows a meningitis, which, though usually richer in plasma cells, degenerative products, and general debris, may differ in no essentials from the syphilitic meningitis. The great distinguishing feature between the two disorders, as regards the exudate, is the fact that in the brain of typical general paralysis lymphoid and plasma cells are not limited to the meninges, and to extensions inward from these, as they are in cerebral syphilis, but these cells are also found independent of the meninges in the blood vessel sheaths in all layers of the cerebral cortex, marrow, brain stem and spinal cord (Plate V, Fig. 1).

The anatomical collection of the Psychiatric Institute contains over one hundred and seventy cases of general paralysis; six or seven of these cases, usually those of long duration, have been included in the paralytic group with some hesitation, as the anatomical picture of general paralysis was not entirely typical; lymphoid and plasma cells were, as a rule, scanty in the meninges of these cases, even scantier in the depths of the cortex, though still unquestionably present, and apparently independent of the meninges. To these cases (see more particularly Cases II and III below) I would call special attention, because of their close anatomical resemblance to certain cases of cerebral syphilis of meningeal type which follow.

The syphilitic cases referred to belong to a group in which mental and physical symptoms often (but not always) appear many years after the original infection. In the New York State Hospitals, from which our material comes, this is a large and important group. As a group I think it is not referred to in the literature, though isolated cases are often met with. No clear clinical picture can yet be made; diagnoses have varied from brain tumor, epilepsy, and arteriosclerosis, to general paralysis. It is especially within this group of late-appearing brain syphilis that an organic type of reaction, with memory defects and deterioration, often comes on, resembling general paralysis so closely that the elect are in doubt, if not actually deceived; in other words, it seems impossible during the life of certain of these cases to determine clinically whether they are general paralysis or cerebral syphilis, even with the aid of the Wassermann reaction.

The interval between infection and the outbreak of mental symptoms is not always free in these syphilitic cases, though it

may be free. Transient or more permanent palsies of the eye muscles or of other muscles, or apoplectiform attacks, may have occurred from time to time in the interval, thus giving intermittent hints of a syphilitic process which is not quiescent. In general paralysis likewise—but much more rarely—similar episodic attacks may appear in the interval between infection and the mental outbreak. The following three cases, all believed to be general paralysis, illustrate in part the difficulties of clinical diagnosis, and to some extent the difficulties of anatomical diagnosis, and all show apoplectiform attacks.\*

CASE I (No. 669).—The patient, F. V., a Swedish elevator man, 40 at death, came to autopsy from the Institute service of the Manhattan State Hospital April 4, 1911. He seemed normal until the age of 34, when, after a syphilitic infection ten months previously, he had a sudden right hemiplegia, with inability to move the arm especially. The hemiplegia largely cleared up in about a month under mercury and iodides, so that he again worked for four years, but even at the end of that time he had as residuals, slight right-sided weakness, spasticity and dragging of the right foot, increased reflexes, especially on the right, right ankle clonus, and usually a right Babinski-sign. The weakness disappeared; the other residuals persisted until death. The pupils were at all times unequal, the right being the larger; they reacted poorly to light, but promptly to accommodation.

About four months before admission he left his job, could not find another, then became depressed, talked of suicide, and was committed to the hospital. At first he rapidly improved, his depression disappeared and he became mildly elated. His spontaneous speech was good; in test phrases it was at first recorded as sticking, slurring and drawling, but later it was correct, even in tests. Writing, memory and retention were good. Two and a half months after admission he was paroled in charge of a friend, and after working for a time, during which he felt well and showed no memory defects or other trouble, he suddenly had a convulsion, with unconsciousness for two or more days, and was readmitted, about thirteen months before death, in a peculiar,

\* It has been found practically impossible to give due credit by name to the various physicians who have collected the clinical data in the cases cited, consequently only the hospitals from which the cases came are credited.

aggressive, flippant, mixed-up condition. At this time his answers were so foolish and his realization of his surroundings was apparently so good that for a while he was suspected of malingering. A month later he was contradictory and inconsistent about dates and events. He asked the same questions over and over and seemed to have absolutely no retention. Memory at first was quite untrustworthy for all events; later he gave a fair account of the first twenty years of his life, but was completely mixed up concerning the last twenty years. Speech was thick and very monotonous, but his words were not actually distorted. His personality was considered to be well preserved, but he had little insight. Several lumbar punctures showed positive cell counts, and there was a Wassermann reaction in both the blood serum and spinal fluid. Death occurred after a series of convulsions. The clinical diagnosis was cerebral syphilis.

Post mortem an exceptionally mild grade of general paralysis, so considered, was found pretty generally distributed in the cortex of both cerebral hemispheres; in places the changes were so slight as hardly to be recognizable, but in the lower left parietal region, in the central operculum, and in the anterior two-thirds or more of the left temporal lobe there was an abrupt change—without any surface indications to suggest it—to one of the most intense, deep-seated inflammatory processes in our collection. Here both the pia and the cortical vessels became suddenly densely infiltrated according to the paradigm of general paralysis, the cortical infiltrate seeming not to depend for its presence on that in the pia; disorganization and destruction of the cortex were in places essentially complete, and the exudate not infrequently was found outside of the vessel sheaths. The only other area showing such extensive changes was a narrow strip in the right hippocampal region. See Plate IV, Fig. 1, which shows the condition in the left frontal region as compared with Fig. 2, which is from the temporal lobe. The anterior half of the left temporal lobe was decidedly atrophic, but the left hemisphere, as a whole, weighed only thirteen grams less than the right.

This case, while not wholly clear anatomically, shows not only the difficulty in clinical diagnosis, but also a patchy focalized type of reaction—probably general paralysis—distributed in those parts of the brain which are specially prone, as described later, to

show the more unusual types of syphilitic reaction seen in the so-called borderline cases. The case, in the abrupt, intense and patchy character of the exudate, and in the localization of the specially affected areas, was quite different from ordinary focalized cases of general paralysis, a number of which are contained in our collection. A softening in the left crus cerebri explained the right hemiplegia.

**CASE II (No. 673).**—J. G., aged 47, was a patient who came to autopsy from the Institute service of the Manhattan State Hospital May 29, 1911, with a doubtful clinical diagnosis. At first he was considered general paralysis, later cerebral syphilis. He probably had had syphilis, but the date was uncertain; he put it near the time of admission, ten years before death, but this seemed unlikely, as at that time he already had Argyll Robertson pupils, diminished knee jerks, and a slightly tabetic gait. For a year after admission he was mildly elated, grandiose, and without insight; afterwards he grew quieter, had a good memory and good insight, but after some depression he again grew megalomanic. He had had transitory left-sided paralyses from time to time, but five years before death he had a permanent left hemiplegia, with flattening of the left face, spasticity of the left arm and leg, but good power, exaggeration of all tendon reflexes, left hemianopsia and left hemianesthesia; there were left-sided convulsive attacks, with clear mentality immediately afterwards; these attacks recurred until death. Speech was mostly correct except for slight tremor, but his writing showed typical distortion, *e. g.*, *mthosit* for *methodist*. Lumbar puncture showed marked lymphocytosis. He was usually mildly elated during the last years of his life; his memory was excellent, as well as his orientation and grasp on his surroundings, but he had a few hypochondriacal delusions that he clung to. About a year before death there was a marked spinal lymphocytosis, and a positive Wassermann reaction in the blood serum, but not in the spinal fluid. Left hemiplegia was still well marked, with athetoid movements of the left hand, a left Babinski-sign and left astereognosis and ataxia. He died the day after a left-sided convolution, of hemorrhages in the brain stem (pons region).

At autopsy the right cerebral hemisphere was blood-stained as a result of hemorrhagic pachymeningitis; it was about half as large as the left. Very slight but characteristic changes of gen-

eral paralysis were found, of nearly the same degree as regards infiltrate, in the two hemispheres, but rather more cell loss and disorder in the cortex was noted on the right. The tabetic changes in the spinal cord were somewhat slight; the left pyramidal system was much thinned out, the right looked normal. See Plate VII, Fig. 1, which shows a prefrontal section from this slightly marked case of general paralysis of long duration; compare with Fig. 2, which is from the gyrus rectus of a case of cerebral syphilis.

CASE III (No. 230).—The material, together with a clinical abstract, was received from the Middletown State Homeopathic Hospital in February, 1907. The patient, M. O., a woman, 37 years old on admission, had a psychosis which began abruptly with acute delirious features; these changed later to a symptom complex believed to indicate general paralysis, and the disease ran its course in twenty-three years. No history of syphilis was obtained. At first she had various hallucinations and was quite expansive. Her pupils were said not to react to light in the beginning; later they reacted sluggishly. The more acute symptoms improved and she had some insight, but her memory was evidently defective. At the age of 40 transitory left facial paralysis and ptosis of one lid were recorded; her hands trembled, her voice was shaky, and she could not repeat test phrases; she seemed much demented, but she was still expansive and had "wash-tubs and safes full of diamonds." As time went on she had various paralyses, which apparently cleared up for the most part. She varied from a good-natured condition to a violent, fighting mood, but remained expansive. Deterioration was progressive and marked; she finally became a bed patient, so demented that little that she produced could be understood except profanity. About a year before death the pupils were unequal and did not react; lumbar puncture showed fifteen to twenty lymphocytes "per field." She had one convulsion about this time, the only one mentioned in the record. Examination of the brain showed widespread, but extraordinarily slight infiltration, consisting of lymphoid and plasma cells in the pia mater, and especially slight infiltration about the cortical blood vessels. The process in the pia was usually more pronounced than in the cortex, resembling in this respect syphilis more than general paralysis. The blood

vessels showed atheromatous changes, but nothing clearly indicative of syphilis. See Plate VI, Fig. 1, which is a photograph from the orbital cortex of this case; compare Fig. 2, from the orbital cortex (gyrus rectus) of a case of cerebral syphilis.

Other evidences of kinship in the two groups are seen in their behavior towards antisyphilitic treatment. General paralysis until recently has been so little influenced by therapeutic agents as to be held by some to be unaffected. We know much less about the effect of specific remedies in cerebral syphilis; in some of the fresh cases the results have been excellent, but as far as we know the older cases are nearly as resistant as general paralysis. Experience, combined with experiments, has shown that in healthy individuals even the most diffusible drugs, when introduced directly into the circulation, enter the brain substance and cerebro-spinal fluid only in the slightest traces, if at all, the walls of the cerebral blood vessels apparently forming an effective barrier; this barrier is found to be weakened if the blood-vessel walls are diseased, and it is perhaps the result of different grades of vascular disease that in some cases of cerebral syphilis remedies in effective amounts can pass through, while in other cases they cannot.

Post mortem, in a few of the cases which we have called cerebral syphilis, the problem of diagnosis may be nearly as difficult as during life, for not only in the brain stem and spinal cord, as we have seen, may the changes of general paralysis and cerebral syphilis almost exactly match, but certain regions of the brain, such as the gyrus rectus, or sometimes the temporal lobes, may show a picture under the microscope which reproduces to the life a type of very mild general paralysis, such as was spoken of in the cases of long duration. The cases most difficult to interpret present not only a scattered or patchy exudate of lymphoid cells, and practically always plasma cells, in the meninges of the brain (especially in the gyrus rectus or temporal lobes as already stated), but in the same regions the exudate is also found apparently independently in the vessel sheaths of the cortex. Even in the small vessels which lie deep, and remote from any apparent connection with the meninges, we find, as in mild general paralysis, a few lymphoid cells, occasionally a plasma cell or a mast cell. In these cases the obliterative endarteritis, which regularly belongs with the syphilitic group, is seldom absent and might settle

the difficulty of differentiation, but, unfortunately for diagnosis, such an endarteritis is found at times in unquestioned general paralysis (Plate VIII, Fig. 1)—perhaps as a residual of previous syphilis—and was present in some of the six or seven mild cases already referred to which were believed to be general paralysis. Little help in differentiation can be expected from an examination for spirochætes in the syphilitic group; they have been found very rarely in the gummatous form, and in the endarteritic-meningeal group there are a few positive cases, but the findings are too rare to be of practical diagnostic value.

Strassman, in 1910, found in a man of 26, infected with syphilis in India, who died one year and nine months later with marked gummatous meningo-myelitis and encephalitis, spirochætes in the blood-vessel walls and in the nervous tissues of the brain and spinal cord; this he claims is the first demonstration of spirochætes in the brain and cord of an adult with acquired syphilis.

In the same year (Jan. 30, 1910) a man of 47, with gummatous cerebral syphilis, whose primary infection had occurred about five months before death, came to autopsy in the Manhattan State Hospital, from the service of the Psychiatric Institute; numerous spirochætes were found by Professor James Ewing, of Cornell University, in the gummatous tissue taken from one sylvian fossa of this case (Plate X, Fig. 2); elsewhere, in specimens studied by the writer, they were very few. See "Report of Director of Psychiatric Institute" for 1909-10, pages 43 and 74.

In the cases which follow, V and VI present, in brief abstract, cases considered to be cerebral syphilis, but they showed in places an anatomical picture more closely resembling general paralysis than syphilis. Case IV is an ordinary illustration of cerebral syphilis of meningeal and vascular type.

CASE IV (No. 771).—The material was received, with a clinical abstract, from the St. Lawrence State Hospital in November, 1912. The patient, F. B., was 43; no history of syphilis was obtained. About a year before death he fell against the moulding of his room and was thought to have fractured his skull, but he took a railroad journey immediately afterwards; he had considerable pain in his head at the time, but went at hard work as manager of a typewriter office six weeks after the accident. Later

in the year he had severe headaches and stopped work, but his "mind seemed all right." About three months before death he woke up aphasic, and continued thus until death, presenting the symptoms of a marked so-called sensory aphasia. Examination of general sensory and motor functions on admission was quite negative, except that the knee-jerks were not obtained, while the elbow and wrist reflexes were exaggerated; the pupils were normal. His memory, grasp of the situation, and insight were not clearly determined, owing to the aphasia. Three weeks before death a left-sided stroke occurred, affecting only the arm and face; he never recovered from this. There is no record of lumbar puncture or Wassermann test. The diagnosis was cerebral syphilis and focal softening, but whether this diagnosis was made antemortem or postmortem is not clear. The left temporal lobe was found extensively softened. Typical changes of cerebral syphilis were found in the meninges and in the blood vessels. See Plate V, Fig. 2, and Plate VIII, Fig. 2. The exudates in the cortex of this case looked for the most part like extensions from the exudate in the pia mater.

CASE V (No. 714).—Received, together with a clinical abstract, from the Hudson River State Hospital. The patient, J. B., aged 45, had been an efficient butler; no history of syphilis was obtainable. He began about a year before death to complain of voices calling him—the devil was in the walls of his room; a girl from hell kept calling to him for help. He became depressed and poorly oriented. On admission his speech was slurring on test phrases; the pupils and knee jerks were active; later his body was held rigid most of the time, and his legs were spastic. Spinal puncture showed 60 to 150 cells per oil immersion field; no record of a Wassermann test is at hand. He died after numerous convulsions. The clinical diagnosis was cerebral syphilis. The microscope showed in most of the cerebral convexity only a scattered exudate in the pia, with very little change in the cortex, but in the gyrus rectus and left temporal lobe well marked meningitis was present, with not only extensions into the cortex, but also in places a picture of deep-seated reaction strongly resembling general paralysis. In many of the large blood vessels there was a marked girdling endarteritis, and a massive infiltrate in the adventitia. See Plate IX for a section of a vessel wall from this

case; also see Plate VI, Fig. 2, and Plate VII, Fig. 2, for examples of deep-seated exudates, as seen in the gyrus rectus of this case, and compare with these syphilitic sections the sections of mild general paralysis placed alongside.

CASE VI (No. 569).—The material and the clinical abstract were received from the Hudson River State Hospital. (For further details see "Report of Director of Psychiatric Institute" for 1909-10, p. 97.) The patient, I. D. C., was 54 years old at death. He had had syphilis at 39, and a transitory left-sided stroke at 43. His psychosis began about two years later, when he became restless, forgetful, erotic and untidy. His pupils were contracted and sluggish; there were facial tremors, but no speech defect; the reflexes were exaggerated; the gait unsteady. Memory retention, insight and judgment were all defective. The cerebral blood vessels were typically syphilitic, and small foci of softening were found in the basal nuclei. Lymphoid and plasma cells were found in the pia mater of the brain, and—especially in the basal parts—local exudates were present in the deep cortex that did not seem to be explained by extensions from the pia. The medulla oblongata and spinal cord showed a distribution of exudate, such as is usual in the syphilitic cases. See Plate II, Fig. 2, taken from the upper cervical cord of this case; compare with Fig. 1, which is a specimen from the cervical cord of a case of undoubted general paralysis, as shown in Plate V, Fig. 1.

In the face of this evidence, not only in the brain stem and spinal cord of cerebral syphilis, but in the cerebral hemispheres as well, one begins to wonder whether this somewhat regional, deep-seated inflammatory process, apparently disconnected with that in the meninges, and resembling that seen in the slighter cases of general paralysis, is in any *essential* way different from true general paralysis. In cases which we have called general paralysis of long duration hardly more exudate—sometimes decidedly less—is found in the depths of the cortex than in these cases which we have called syphilitic. On the unessential detail of the simple amount of an exudate no differential diagnosis should be based. One asks, *Are the exudates essentially different in kind?* and we can only say that from case to case they do differ, but mainly in the relative number of plasma cells, not in essentials; and we may also say that from the primary sore through the secondary

tertiary, and what we have called the metasyphilitic lesions essentially the same kind of cellular exudate meets us.

If the exudates in these cases of syphilis and general paralysis do not essentially differ in kind, does their difference in distribution justify the formation of separate groups of diseases? Ordinarily, and for practical purposes of grouping, yes; but in these borderland cases the pictures of general paralysis and cerebral syphilis become so nearly the counterparts of each other that we can hardly speak of any essential difference in distribution. The two processes look alike; they run together both anatomically and clinically; we hesitate in which group to place the case, and finally end, if forced to classify, by letting a syphilitic endarteritis or other contributory evidence decide the point. In other words, there is nothing very fundamental in all these fine distinctions about just where an exudate must be, and the conviction grows—anatomically speaking—that in certain cases our groups—ordinarily distinct—come together and fuse, and that we are dealing only with different varieties of the same thing.

Certain authors, for example Sträussler, who described what he considered to be gummata in general paralysis, have insisted that syphilis and general paralysis may coexist in the same case. If the two groups have a common cause we would expect the characteristics of one group to appear occasionally in the other. Typical syphilitic endarteritis, for example, as already stated, occasionally is found in equally typical general paralysis, probably most often as a residual of previous syphilis; and cases which we call cerebral syphilis, as we have seen, may present in places an apparently independent cortical exudate more characteristic of general paralysis.

We have thus far spoken exclusively of the cellular exudate; it is of course not the disease, but it is practically sufficient for diagnosis and differentiation, and is the clearest, most usable expression we have of the reaction to the virus which sets the disease agoing. The other and older data of diagnosis, such as degeneration of superficial or deeper-lying nerve fibers, degeneration and thinning of the rest of the nervous parenchyma with neuroglia increase, are still important, vastly more important, of course, functionally speaking, than the exudates, but the exudates are by far the safest index of activity in the borderline cases, where

evidence of loss of nervous tissue is not always plain and needs further study.

The writer has never been able to see a very fundamental importance in the discussion as to whether in general paralysis the so-called inflammatory process, or the degenerative process affecting the parenchyma, is the primary thing; that the changes in both the parenchymatous and vascular tissues go hand in hand as an expression of the injury wrought by the causative agent, and that neither strictly deserves the designation of "primary" appears most probable. While this seems true, it is likely that the parenchyma, being the more vulnerable part, suffers first in the attack.

In cerebral syphilis, on the other hand—omitting the borderland cases—the distribution of this causative agent would appear to be much more restricted than in general paralysis; this restriction is expressed by the relative lack, in cerebral syphilis, of any clear reaction in the parenchymatous parts of the hemispheres, while in the meninges, or in the intima of certain blood vessels, or in both, the reaction is plain.

Tabes—a so-called metasyphilitic process—which not infrequently shows, in the spinal pia and blood vessels, a typical lymphoid and plasma cell exudate, also forms an interesting link between general paralysis and the late forms of syphilitic meningitis, and serves to strengthen the belief that no real borderline exists between them. If cerebral symptoms appear in a case beginning as tabes we may find postmortem a reaction in the brain either of the type of general paralysis or of the syphilitic type, as above described; thus all psychoses rising on the ground of tabes are not general paralysis, and the exudative changes in the brain, whether they take on the type of general paralysis or that of syphilitic meningitis, are best understood, not as the introduction into the brain of another disease foreign to the tabetic process, but rather as an enlargement of the field of action of the same agent which produced the tabes. If this view is correct, general paralysis and cerebral syphilis, when arising on the ground of a tabes, would have a common etiology, differing only in their distribution.

The following case, briefly abstracted, may serve as an example of the development of cerebral syphilis in a tabetic setting. For further details see Rev. of Neurology and Psychiatry, Vol. IX, p. 538, where the case is reported by Dr. D. K. Henderson.

**CASE VI (No. 727).**—The patient, J. P., a mason, aged 49 at death, came to autopsy from the Institute service of the Manhattan State Hospital January 14, 1912. He had had syphilis, but the date was unknown. About two years before death he showed tabetic signs and failing vision, and a diagnosis of locomotor ataxia was made. Soon after this he became depressed and suicidal and was committed for this reason. Speech and memory were not affected; he had no delusions, and had considerable insight. The spinal fluid showed only six cells per cubic millimeter; Noguchi's modification of the Wassermann test was negative in both the spinal fluid and blood serum. A syphilitic meningitis, especially basal, was found in the brain; also in the medulla oblongata and spinal cord. Tabetic changes were fairly marked in the cord; extensive pyramidal tract degenerations were also present. The patient was bedridden, and his legs were very weak, but more definite symptoms from the pyramidal degenerations seem not to have been noticed. See Plate III, Fig. 2, which shows a deep exudate about the blood vessels in the medulla oblongata of this case; compare Fig. 1, from the medulla oblongata of a case of undoubted general paralysis, with unusually marked changes in this region.

The conclusion previously reached by a study of the borderline cases, that the syphilitic and metasyphilitic disorders probably were only different modes of expression of the same cause, has lately been reinforced by the discovery of Drs. Noguchi and Moore of the *Treponema pallidum* in twelve out of seventy cases of general paralysis. Spirochætes therefore (presumably the same) have now been found in both the syphilitic and "metasyphilitic" groups. What determines the presence and the distribution of these organisms in the nervous system we do not know. It seems probable that they enter by way of the blood as certain bacteria do. These bacteria set up sometimes an acute meningitis essentially limited (like that of brain syphilis) to the meninges; sometimes they set up a deeper process, in which the exudate is distributed (more as in general paralysis) throughout the deeper parts of the cortex, as well as in the meninges. I do not mean to say that the spirochætes are distributed in the same way as these bacteria, for we know as yet very little about their distribution, but an analogy is at least suggested. The

evidence furnished by Dr. Moore's specimens, showing spirochætes in general paralysis, tends to show that in that disease the organisms usually lie scattered through the nervous tissue, and not in the meninges or in the vessel walls (Plate X, Fig. 1). Such a position of the spirochætes fits in perfectly with the more generalized spread of the cellular reaction in general paralysis, as well as with the more generalized decay of nervous tissues seen in that disorder; while in cerebral syphilis the presence of spirochætes in meningeal gummata, and in and around the walls of blood vessels, fits in well with the approximate limitation of the reaction in that disease to the meningeal tissues, and with the slighter loss of nervous parenchyma as compared with the ordinary case of general paralysis.

#### SUMMARY AND CONCLUSIONS.

To me the most helpful viewpoint, and the one which seems most in accord with the anatomical facts, is to regard the syphilitic and so-called metasyphilitic disorders as usually distinct varieties of the same general process.

This viewpoint is based on the following facts:

In the brain stem and spinal cord of both groups the character of the exudate and its distribution are much the same.

In the cerebral hemispheres, on the other hand, while the exudate in the two groups is the same in kind, it usually differs in distribution; the syphilitic exudate being essentially in the meninges, the metasyphilitic being more especially in the cortex as well as in the meninges, but borderline cases exist which anatomically may be interpreted as either syphilitic or metasyphilitic and point to a fundamental similarity.

Furthermore, signs of combination are seen in the rare coexistence of gummata, or less rarely of syphilitic endarteritis, with so-called metasyphilis, *i. e.*, general paralysis.

In cases beginning as tabes, when mental symptoms appear, the brain may show the changes either of cerebral syphilis or of general paralysis, again suggesting a common origin.

The serum reactions in the two groups also point to a common etiology.

Finally, with the discovery of the treponema pallidum in general syphilis, in brain syphilis, and in the so-called metasyphilitic

conditions (general paralysis, etc.), we can hardly avoid the conclusion, already arrived at before this discovery, that the groups had best be regarded as different forms of syphilitic reaction, but not as essentially different processes.

Our viewpoint in no way lessens the importance of these different groups, or the desirability of keeping them separate, but it brings them, for purposes of study, into what seem to be their natural relationships.

#### DESCRIPTION OF PLATES.

**Plate I.**—A comparison of the changes seen in the lumbar region of the spinal cord in general paralysis (Fig. 1), and in cerebral syphilis (Fig. 2).

Fig. 1.—Lumbar cord; photograph from a case of plain general paralysis. Note the infiltrate in the pia mater, and about the blood vessels of the deeper parts.

Fig. 2.—Lumbar cord; photograph from a case of cerebral syphilis; the same features are shown as in Fig. 1, but the deep infiltrate is slighter.

**Plate II.**—A comparison of general paralysis (Fig. 1), and cerebral syphilis (Fig. 2), as seen in the upper cervical region of the spinal cord.

Fig. 1.—Cervical cord; photograph from a well-marked case of general paralysis; the deep-lying perivascular exudate seems to be independent of that in the meninges.

Fig. 2.—Cervical cord; photograph from a case of cerebral syphilis, Case VI, showing deep-lying blood vessels.

**Plate III.**—A comparison of general paralysis (Fig. 1), and cerebral syphilis (Fig. 2), as seen in the medulla oblongata.

Fig. 1.—Medulla oblongata; photograph from a well-marked case of general paralysis; the amount of deep infiltrate is unusually great for this region.

Fig. 2.—Medulla oblongata; photograph from a case of cerebral syphilis which developed after tabes, Case VII. The superficial and deep infiltrates are plain.

**Plate IV.**—Local variations in exudate seen in the same case (Case I), which was considered to be general paralysis; mild changes (Fig. 1), intense changes (Fig. 2).

Fig. 1.—Photograph from the left frontal region, showing very slight changes.

Fig. 2.—Photograph from the left temporal lobe, showing intense superficial and deep changes.

**Plate V.**—A comparison of typical general paralysis (Fig. 1), with typical cerebral syphilis of meningeal and vascular type (Fig. 2).

Fig. 1.—Photograph from the orbital cortex of plain general paralysis. Note the cellular exudate in the pia mater with extensions downward along the vessels; also the deeper process, apparently not the result of extension from the pia.

Fig. 2.—Photograph from the gyrus rectus (orbital surface) of Case IV, showing well-marked syphilitic meningitis, with some extensions along vessels which enter the cortex; little change in the deeper vessels. See Plate VIII, Fig. 2, for the blood vessels of this case.

**Plate VI.**—A comparison of very mild general paralysis of long duration (Fig. 1), with cerebral syphilis (Fig. 2).

Fig. 1.—Photograph from the orbital cortex of Case III, which was considered general paralysis of long duration. There is a fair exudate in the pia; in the cortex it is very scanty.

Fig. 2.—Photograph from the orbital cortex (gyrus rectus) of Case V, cerebral syphilis. This case showed considerable extension of the exudate from the pia into the cortex and, regionally, a deeper seated exudate resembling closely that of general paralysis. See Plate VII, Fig. 2, for an even more striking example from this same case; also Plate IX, which is a photograph of the wall of a blood vessel from this case.

**Plate VII.**—A comparison of mild general paralysis of long duration (Fig. 1), with cerebral syphilis (Fig. 2).

Fig. 1.—Photograph from a section of the prefrontal cortex of Case II; mild general paralysis of long duration. Parenchymatous loss is not at all striking, but there is some disorder in the cortex, and very slight cellular infiltration. The pia contains rather little infiltrate.

Fig. 2.—Photograph from a section of the gyrus rectus of Case V; cerebral syphilis. The cellular exudates in the pia mater and in the deeper layers of the cortex appear to be independent of each other, as in general paralysis.

**Plate VIII.**—A comparison of syphilitic endarteritis as occasionally found in general paralysis (Fig. 1), with syphilitic endarteritis in cerebral syphilis (Fig. 2).

Fig. 1.—Photograph of a syphilitic artery in cross-section from a case of typical general paralysis. Note the well-organized ring of thickened intimal tissue, the cellular infiltration of the adventitia, and the intact membrana elastica.

Fig. 2.—Photograph of arteries, and part of the outer layer of the cortex, from Case IV, which is an ordinary case of syphilitic meningitis and endarteritis. In the largest vessel cellular infiltration of the adventitia and thickening of the intima are well shown. The membrana elastica is preserved.

**Plate IX.**—Photograph of a cross-section through the walls of a cerebral artery from Case V, a case of cerebral syphilis, which showed local features resembling general paralysis. Note, at the top of the plate, the massive cellular infiltration of the adventitia; the serpentine band of elastica about the middle of the plate, and the much thickened and somewhat infiltrated intimal layer occupying the lower half of the plate.

**Plate X.**—Spirochætes in general paralysis (Fig. 1). Spirochætes in cerebral syphilis (Fig. 2).

Fig. 1.—Photograph of spirochætes from the outer cortical layers in a case of general paralysis; made from a slide stained and presented to the writer by Dr. J. W. Moore, of Central Islip State Hospital.

Fig. 2.—Photograph of spirochætes from gummatous tissue in the sylvian fossa of a case of gummatous cerebral syphilis of short duration (the case is referred to in the text). The photographs were made from a specimen stained by Professor James Ewing, of Cornell University.

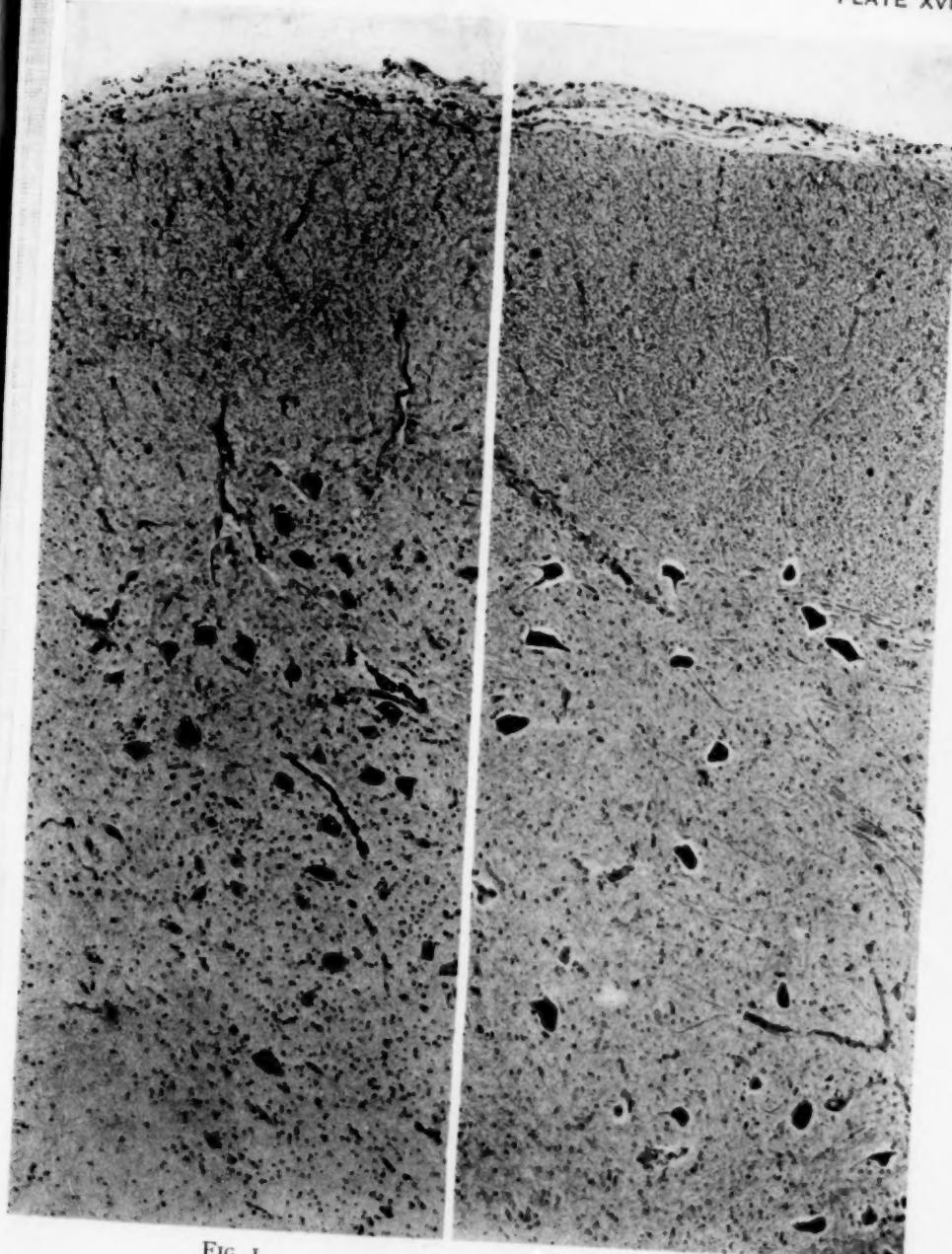


FIG. 1.

PLATE XVII.

FIG. 2.

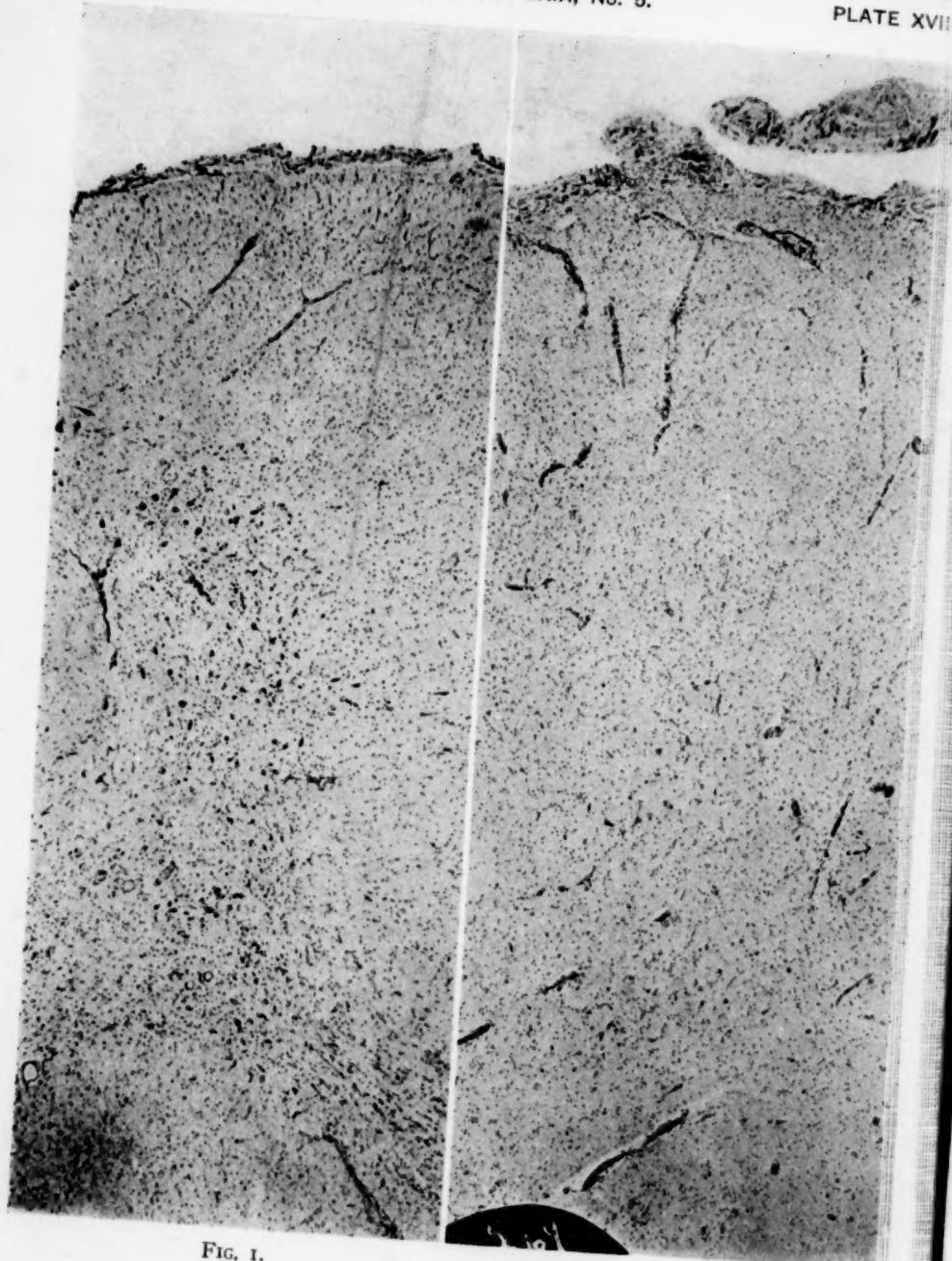


FIG. 1.

PLATE II.

FIG. 2.

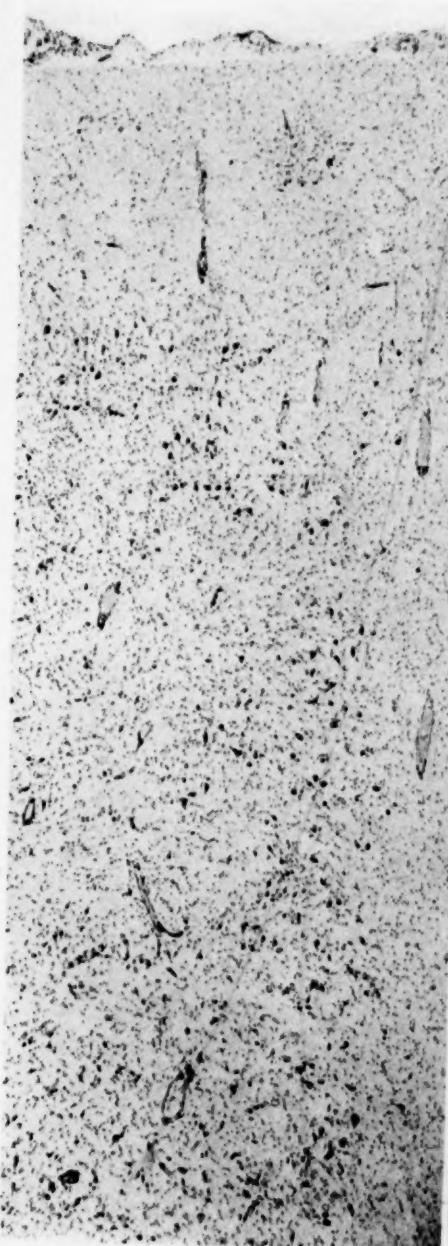


FIG. 1.

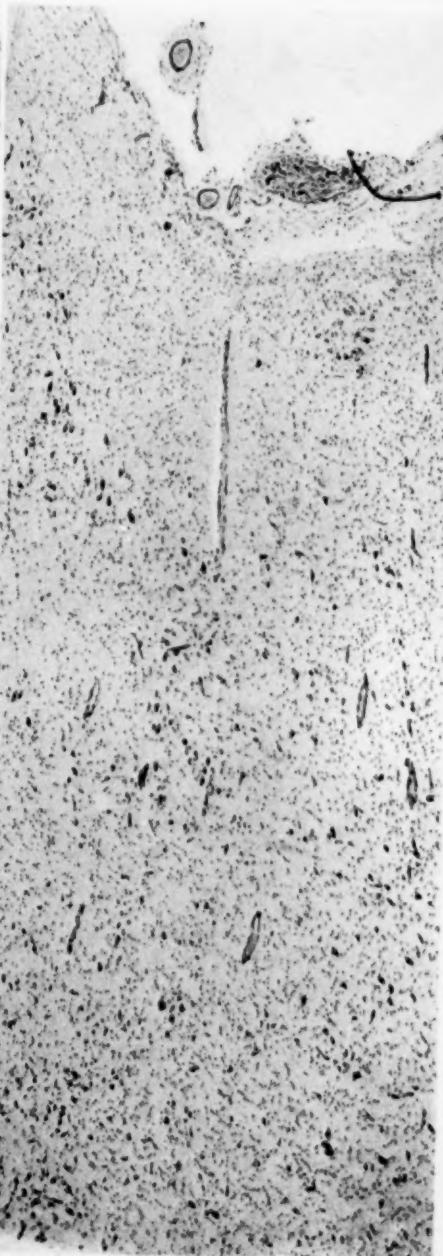


FIG. 2.

PLATE III.

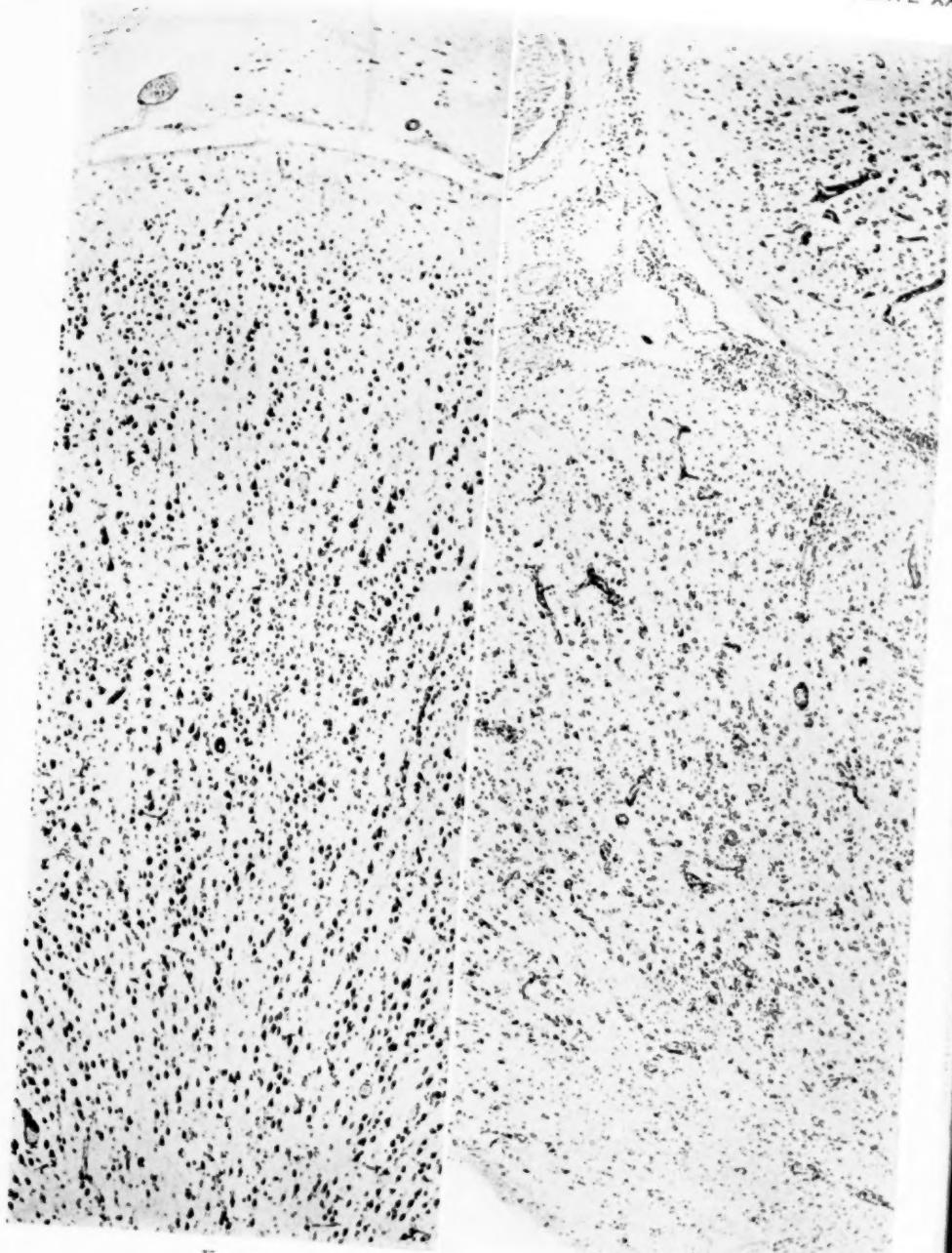


FIG. 1.

PLATE IV.

FIG. 2.

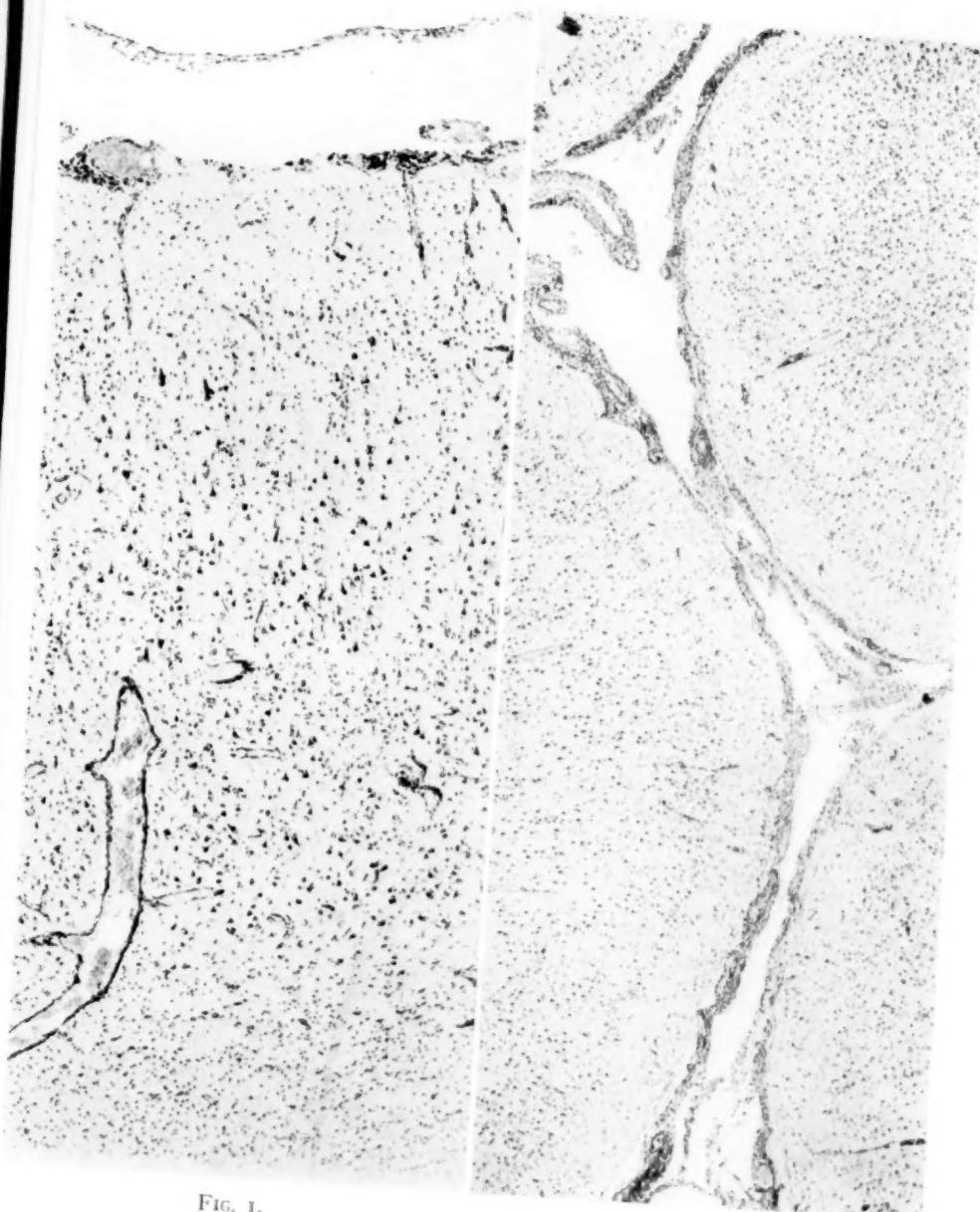


FIG. 1.

PLATE V.

FIG. 2.

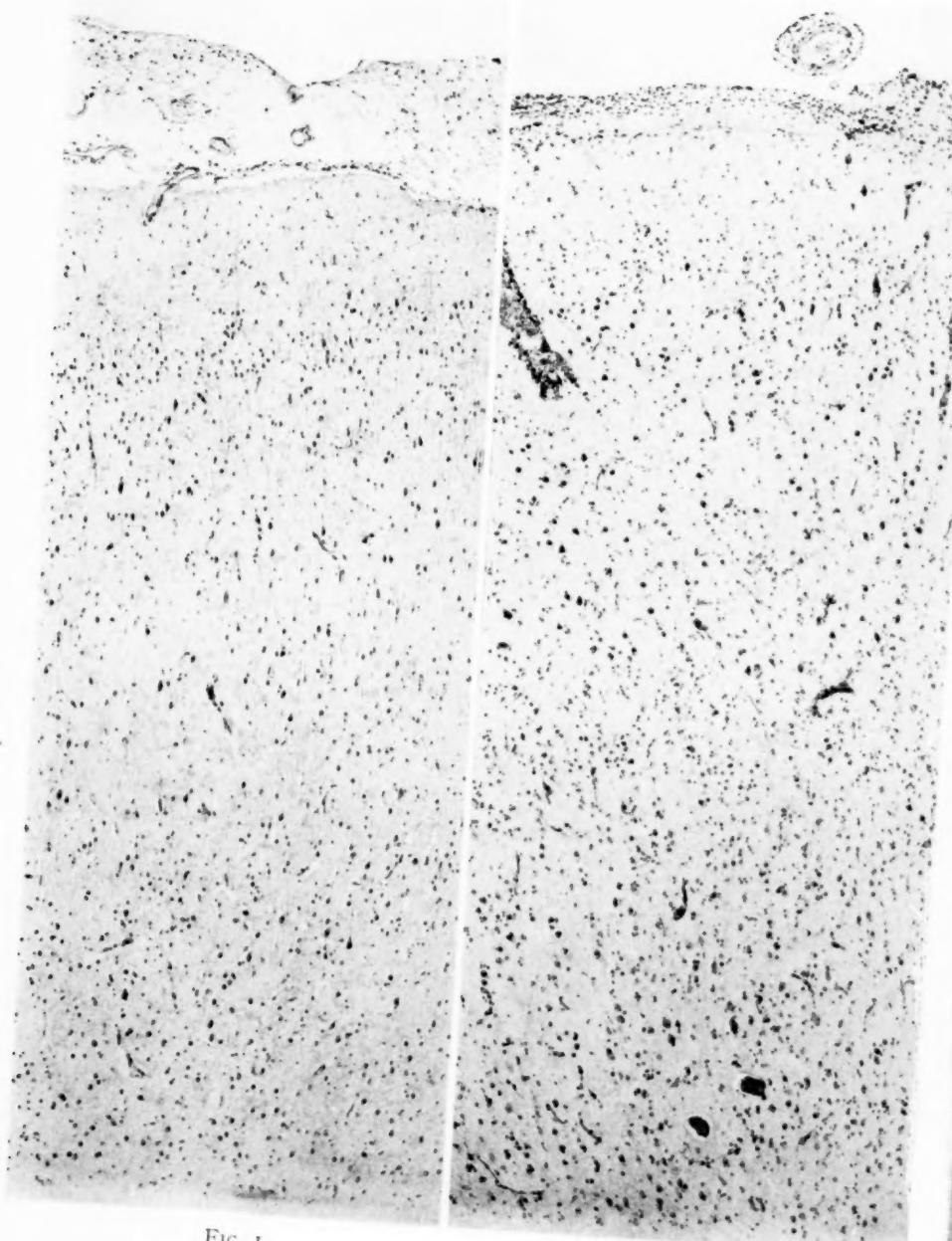


FIG. 1.

PLATE VI.

FIG. 2.

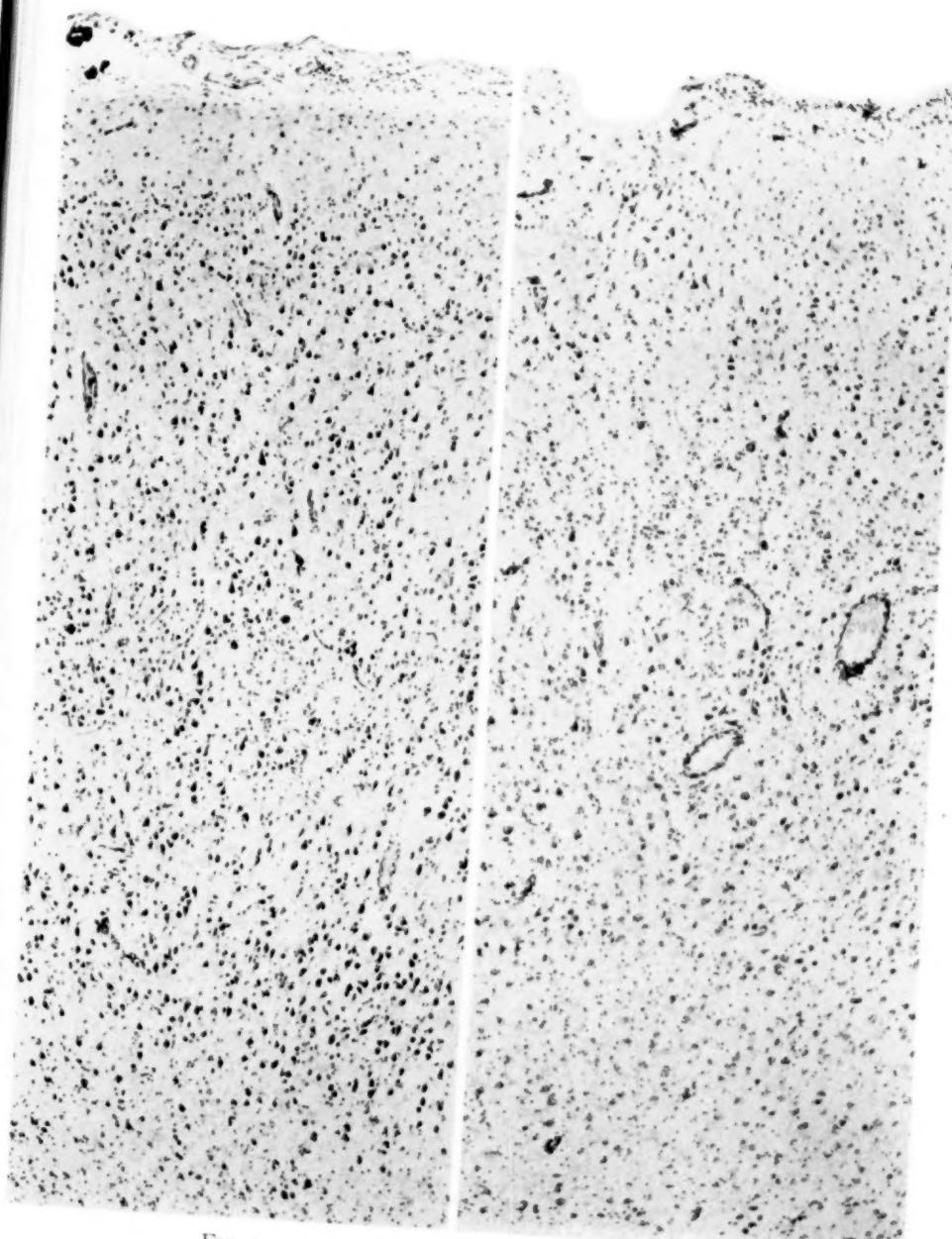
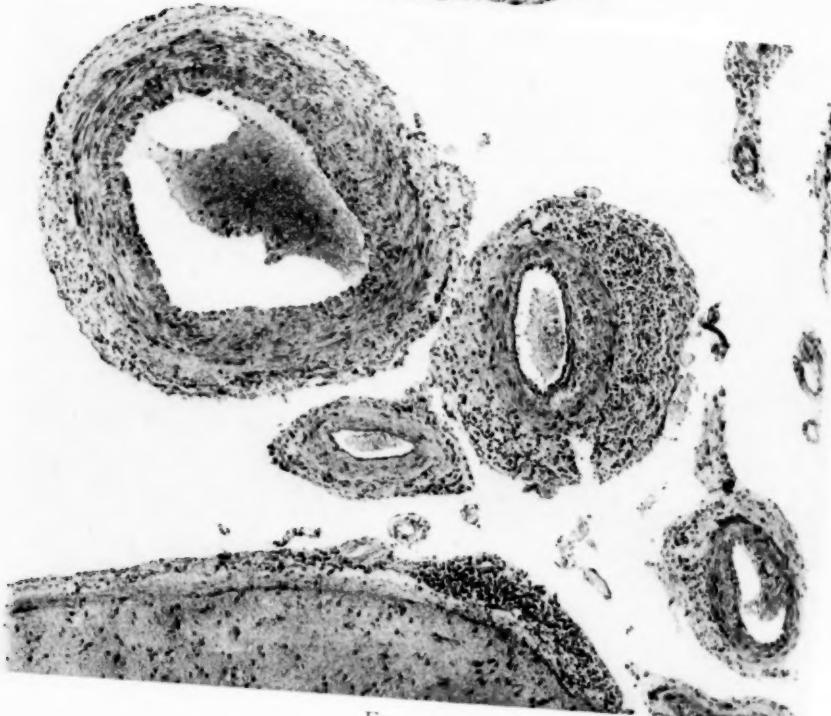
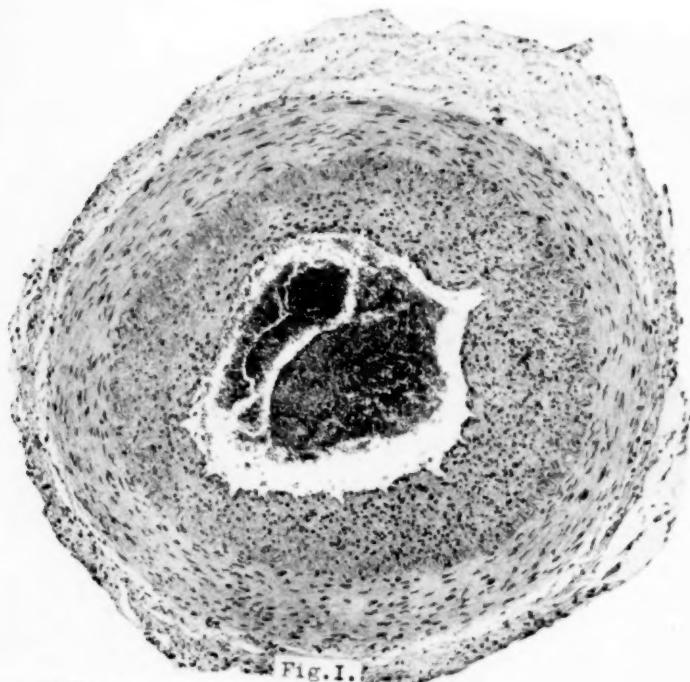


FIG. 1.

PLATE VII.

FIG. 2.



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PLATE XXV.

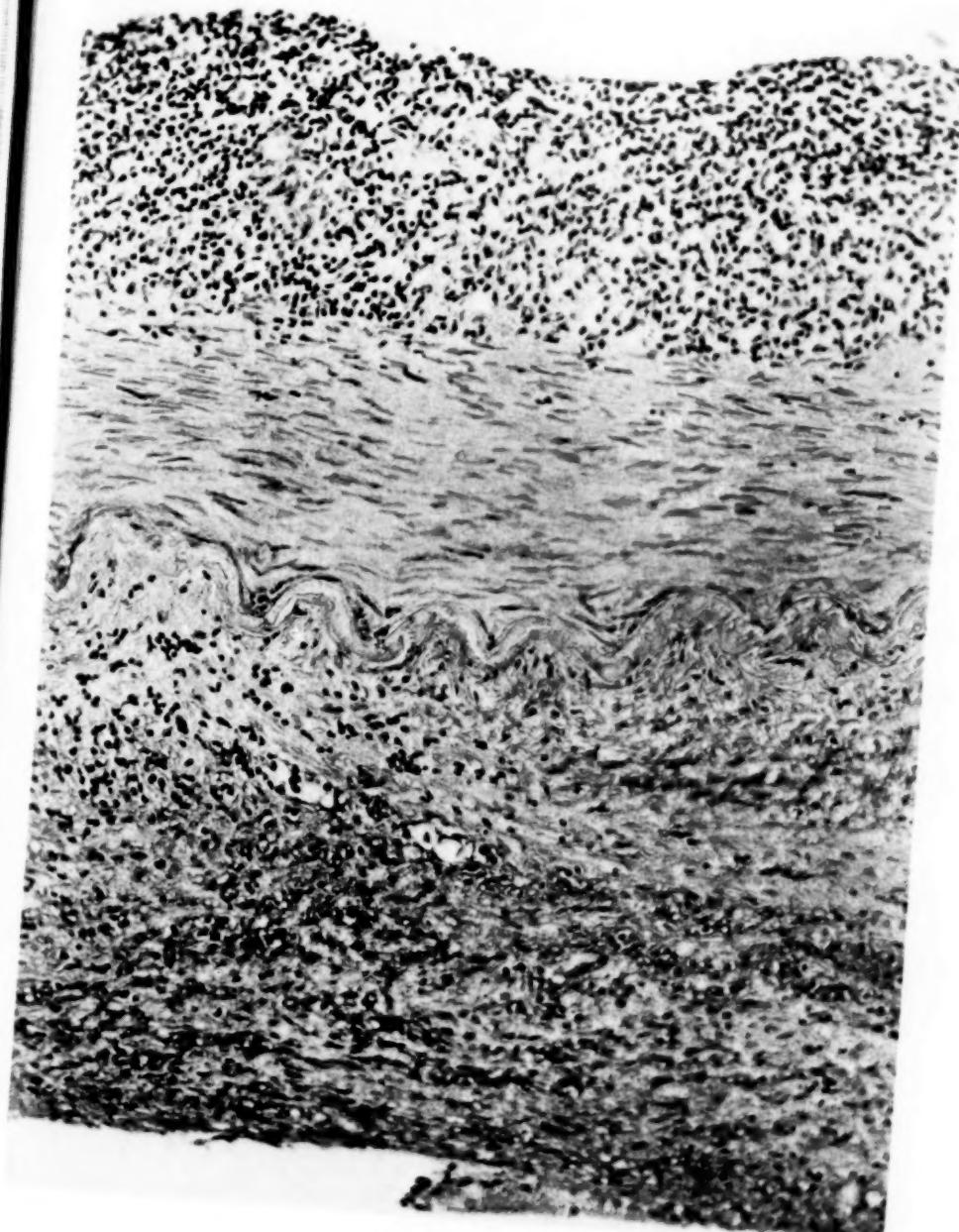


PLATE IX.



PLATE X.

## MENTAL DISORDERS AND CEREBRAL LESIONS ASSOCIATED WITH PERNICIOUS ANEMIA.\*

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One of the most promising fields for psychiatric investigation is that of the somatic disorders which show associated mental symptoms, and in particular those which show a specific tendency towards structural involvement of the central nervous system.

The selection of these disorders will largely be determined by the material at hand.

It has seemed to us that, at least in Michigan, pernicious anemia is so frequently observed among patients in hospitals for the insane that its influence as a factor in the production of mental disorders has been underestimated. In some instances this association has been but incidental.

In the past few years we have received among some 650 autopsies upon the insane 15 cases of pernicious anemia. This may be influenced somewhat by local conditions, as, in Michigan, pernicious anemia is relatively more frequent among diseases in general than elsewhere. During recent years cases of pernicious anemia have formed somewhat more than 4% of the admissions to the medical service of the Hospital of the University of Michigan.

In the text books of internal medicine and special treatises on blood diseases it is usually mentioned that mental abnormalities may occur in pernicious anemia. In the text books of psychiatry a slight consideration is given to the etiologic importance of this disease and in a few some reference is made to clinical casuistics.

Apart from the stupor, the apathy and irritability which have most frequently caught the attention of clinicians as occurring in the more asthenic phases of the disease, there have from time to time appeared reports upon more developed mental disorders, associated with pernicious anemia.

\* Address delivered at the opening exercises of the Henry Phipps Psychiatric Clinic, The Johns Hopkins Hospital, Baltimore, Md., April 16-18, 1913.

In most of these more attention has been given to the neurologic disturbances and the cord pathology than to the mental features. The greater number of mental disorders which have been noted as symptomatic of pernicious anemia relate to the occurrence of an amentia symptom complex with delirious features, usually occurring toward the end of the disease.

It is this type of disorder which Bonhoeffer has described at some length in his recent consideration of the psychoses symptomatic of states of infection and exhaustion.

Little or no attention has been given to the fact that in this disease there not infrequently occur peculiar paranoid conditions which, in their symptomatology, show the psychogenetic influence of factors which have their basis in the situation of the patient by reason of his physical disease.

The importance of pernicious anemia for the production of characteristic lesions of the spinal cord has long been a part of our neurologic knowledge. But of its relation to the production of lesions of the substance of the brain we know little.

It would seem *a priori* that the type of lesion which is present in the cord in pernicious anemia, namely, a process which peculiarly affects fiber structures, and which has a disseminated character, might be found in the brain, but until now this has not been observed. As yet there do not exist, to our knowledge, more than a few studies of the cortex in pernicious anemia by modern cytologic methods, or observations of any definite changes in the brain except the occurrence of hemorrhages or vascular alterations. The fact that so many cases of pernicious anemia show mental abnormalities would suggest that there might be involvement of the structures of the brain.

From our own material we have been able to study clinically the mental disorders of 11 cases, and in nine of these to make a histologic study of the brain.

The symptomatology of these cases showed considerable variety. Two were cases of epilepsy; two were not to be differentiated from dementia praecox; one was a questionable manic-depressive psychosis and six presented a characteristic picture of an asthenic state in which there developed a mental disorder of a paranoid type. It is to these paranoid conditions that this study is particularly devoted.

From our material we have selected brief accounts of six cases. The first two of these, cases 181 and 401, showed but slight tendency toward delusional elaboration. In the remaining four the paranoid features were well developed.

**CASE 181.**—J. W., a female, with hereditary predisposition, in that her mother was psychopathic, and an aunt and cousin had been insane.

Her condition did not attract attention until she was 48 years of age, when following the death of her husband she showed a degree of depression and worry that was of uncalled-for intensity; with this came a marked irritability. She found fault with everything that was done for her and it was impossible to satisfy her. At the age of 50 she remained in bed, complaining of being unable to work; she developed the idea that her family were against her. Her physical health had much deteriorated. At the age of 54 she came into the hospital. She was extremely anemic in appearance, the skin was yellowish and her muscular strength was greatly weakened.

There were subjective complaints of pain in the lumbar region and epigastrum, but until late in the course there were no objective disturbances of sensibility. She showed Romberg's symptom, ataxia and feebleness in her gait. The knee-jerks were barely obtainable. Examinations of the blood showed the characteristic findings of pernicious anemia. The red cells varied at different times, between 1,250,000 and 680,000 and the haemoglobin between 40 and 15 per cent. The neurologic disturbances became progressively more marked. The knee-jerks entirely disappeared. She complained of numbness in the hands and of being unable to feel objects. On one occasion she complained of a transitory inability to see.

Mentally she at all times showed an extreme irascibility. She grasped questions clearly but fatigued easily and, losing interest, gave incorrect and careless replies. Her thought was self-centered, but much influenced by suggestion. There existed a striking disproportion between her ability to do things when not under observation and when in the presence of others.

Eleven days before death the consciousness was unclear much of the time, the speech was thick and there were many perseveratory reactions. At times she talked much in a rambling, disconnected way. She became disoriented for time and persons, miscalling those around her. An edema of the legs became marked and death occurred five months after her admission.

In this case we have developing in one who is of predisposed constitution a mild depression, with irritable mood and slight delusions of persecution; later on in the course pernicious anemia developed with neurologic symptoms referable to cord involvement.

Toward the termination there occurred uncleanness of comprehension, disorientation and disturbed associations.

The cord showed a characteristic degeneration of the pernicious anemia type; in the dorsal and lateral columns were many small myelitic foci.

The cortex showed interesting pathologic changes. The nerve cells showed slight but quite distinct disintegration of the Nissl granules, usually most marked at the margin of the base of the cell and in the central region; a few cells showed the characteristic axonal type of degeneration.

The neuroglia cells were moderately increased, with a tendency to group arrangement. Not infrequently these impinged upon cells showing evidences of degeneration. Forms showing progressive types of reaction were common and in several sections a number of typical mitoses were found among the nuclei. Rod cells and cells of odd shapes were present in considerable numbers. The blood vessels showed a lack of normal sharpness of outline. The myelinated fibers immediately adjacent to the vessel were pushed apart and in the spaces were numerous homogeneous coagulated products of degeneration. Spaces in the walls of the vessels usually contained excessive deposits of pigments, giving the reaction of fat.

CASE 401.—E. K., a male, with hereditary predisposition, his sister having been regarded as a case of hystero-epilepsy and ultimately suicided.

At the age of 44 he became, following the suicide of his sister, unduly depressed, and was inactive. He spoke of everything as going to ruin, and that everyone except himself was hypnotized. In such a condition he came into the hospital. He was anemic in appearance, the skin was yellowish and the spleen enlarged. There was a mild degree of chronic nephritis. There was Romberg's symptom, unsteadiness of gait, increased knee-jerks. The blood showed 1,920,000 red cells, 40 per cent haemoglobin and the characteristic cell findings of pernicious anemia. His mood was usually sad; he objected to eating or being fed by such phrases as "You are feeding me too much food; it is somebody else's food; I am not treating people right if I eat."

He rarely spoke spontaneously. At times he was unclear in his comprehension of his situation, and mixed up in his orientation. There was a tendency to confabulation, spoke of wishing to go out and meet some friends who had just come from the old country, at another time he became agitated by the imagined cries of a girl "who was being taken away by some fellows."

The gastric disturbances became extreme, occasionally there were attacks of dizziness. Death occurred after an entire duration of about three months.

In this case we have developing coincidently with progressive anemia a moderate degree of depression, with inactivity and delusions of self-depreciation. There were episodes of unclear comprehension and orientation, which became more marked towards the termination of the disease, of auditory hallucinations, and a tendency to confabulation. With this there were neurologic disturbances referable to involvement of the posterior columns of the cord.

Anatomically there was present an excessive amount of lipoid pigments in the nerve cells, a slight degree of satellitosis, extreme rarefaction of the nerve fibers adjacent to the blood vessels in the white substance, and excessive accumulation of lipoid pigments in the walls of the blood vessels.

The cord showed an active degeneration in the dorsal columns, through the cervical and thoracic regions. The medulla showed, by Marchi's method, degeneration of many of the fibers passing through the raphe and of the intra-medullary portions of both hypoglossal nerves. The changes in the cortex are slight, but are distinctly pathologic. The Marchi degenerations of the medulla are of unusual interest.

In these two cases we have but a slight tendency toward delusion elaboration, the chief features of each being the asthenic condition with the terminal disturbance of the perceptions and orientation.

In a group of cases in which the paranoid character was well developed we have collected four cases. In three of these there were severe pathologic changes in the brain.

CASE 303.—A. M., a female, with predisposition, in that her father was insane.

As a child she was nervous, sensitive and shy. At the age of 34 and 37 she had attacks of what she called nervous prostration, accompanied by numbness in the arms. For some time before the age of 50, when she came into a state hospital, there had developed a change in character. There were auditory hallucinations, voices called her by name and directed her to certain passages in the Scriptures; she felt that she was led by some power, that she was to be required to write a book on Christ's redemption; that the Holy Spirit could do this through her.

Her nutrition was poor and there was a moderate degree of anemia.

Comprehension and orientation were undisturbed; she had a slight inability to recall recent experiences. She was suspicious and irritable; she spoke of being persecuted by her neighbors, and that women were jealous of her. The delusions were not extensively elaborated. There was

slight looseness in the mental associations. Her delusions showed a tendency towards splitting of the personality, as "Two lives worked along together. I didn't eat my breakfast because it was in the past and it was hers."

One year after her admission she complained of pain in her legs. The content of her thought now largely concerned the sensory disturbances which progressively became more marked. The pain that was in her legs she believed was due to having the bed changed. The nurses were her enemies; one of them burned her hair off in the night time. Her body became filled with electricity and she complained bitterly of the treatment. A man who held a mortgage on her property was responsible for her condition.

Examinations of the blood now showed the findings of pernicious anemia. The red cells numbered 1,608,000; the haemoglobin 60 per cent, and on some occasions there were characteristic cell findings.

Toward the end there were severe bowel disturbances; she gradually lost control of her legs and sphincters. Death occurred about two years after her admission.

The cortex showed rather widely distributed, but mild degenerative, changes in the nerve cells. In the larger pyramids of the 3d and 5th layers there were a number of cells showing the axonal type of cell change.

The neuroglia was relatively a little increased. Many nuclei were surrounded by well differentiated bodies. The nuclei were frequently grouped in small clusters. There were observed a number of instances of mitoses in the glia nuclei. There was in many places a relative increase in the number and size of the neuroglia cells around the blood vessels. Rod cells and odd shapes of cells of non-nervous nature were commonly observed.

The blood vessels showed fatty degeneration of the endothelium, and in a number of instances distinct endarteritic proliferation; in one instance nearly occluding the lumen of a medium-sized vessel. There were a number of instances of vessels which were the result of a pathologic proliferation. Most vessels contained pathologic amounts of lipoid pigments.

In the lumen of some vessels there were rarely found oval and long cells with granular cytoplasm, giving the reactions of plasma cells. These were always in the blood stream and never in the vessel lymph space.

The medulla showed a focal degeneration, with accumulation of epithelioid cells filled with fat reacting granules, occupying one

restiform body; many fibers adjacent to this area showed degeneration by Marchi's method. The cord showed degenerations of the pernicious anemia type in dorsal, lateral and ventral columns.

The cortical findings as a whole resembled those in the first case described. The nerve cell degenerations were much the same, and there was a pathologic increase in the neuroglia. The vessels were peculiarly severely altered in this case.

CASE 389.—J. S., a female, hereditary predisposition, her mother having been insane.

At about the age of 35 she developed ideas of reference, and probably auditory hallucinations; spoke of her neighbors calling her names. She led a wandering life, and some months later was confined in jail. There she was in a condition of severe motor excitement, was suspicious of the actions of those around her, and expressed delusions of persecution. This led to her commitment to a hospital for insane. Soon after her admission the excitement passed away and during a residence of 8 months her conduct was not peculiar. There were no neurologic disturbances.

She remained well for three years, when the delusions again became active. There were auditory hallucinations, especially at night, *e. g.*, the neighbors called her names; people were endeavoring to get her away so that they might obtain possession of her farm. She again came into a hospital. She was then in poor physical condition, the heart had a slight mitral lesion. There was an ulcer of one cornea. The tendon reflexes of the legs were absent. There was Romberg's symptom, staggering gait, delayed sensibility in legs and a slight articulatory speech defect. She held ideas of persecution, which were not systematized. Her memory was inaccurate and her mood one of mild apprehensiveness. There was no looseness in her thought and no disturbance of comprehension or orientation. The cerebro-spinal fluid in one examination showed no pleocytosis or increased albumen; at a subsequent examination there were 10 cells per cmm. There developed a pronounced anemia which later gave the characteristic findings of the pernicious type. The red cells numbered about 800,000; haemoglobin 35 per cent, and the types of cells were typical of this disease.

The legs became spastic; she became less clear in her comprehension, and died about five years after the first mental symptoms developed.

The foregoing case is that of a paranoid condition developing in a woman of insane heredity. This condition was characterized by suspicions, delusions of reference and persecution; with periods of severe excitement of short duration. A more or less complete remission occurred for three years, when the delusions and hallucinations returned; these continued without systematization and there was no marked deterioration.

There were neurologic disturbances which were referable to a lesion of the dorsal columns and, towards the last, of the lateral columns of the cord. After the mental symptoms had been in evidence for three years there developed a severe pernicious anemia and the terminal condition showed uncleanness of consciousness.

The autopsy showed a depression about three-quarters of an inch in diameter in the frontal bone above each orbit and one on the right parietal eminence. The pia showed slight turbidity over the frontal region, and a recent hemorrhage above the right parietal region. The basal arteries were "soft and not tortuous."

The microscopic study showed a slight atheroma of the basilar artery.

There was a small area of superficial encephalitis in the cerebellum, involving the layers down to the white substance. This appeared as a broad area of coarse meshy structure, with an absence of nerve structures, and an increase in blood vessels and connective tissue. In this there were small hemorrhages of recent occurrence. Around the area the neuroglia showed characteristic progressive reaction changes. There was no arteriosclerosis of the pial vessels in this vicinity.

The cortex of the frontal and central regions showed very severe changes. The nerve cells for the greater part were shrunken and there was a lessened amount of Nissl granules. The glia was increased in amount. The cells were chiefly of the type having large pale nuclei, and an indistinct body filled with coarse pigment granules. They commonly lay in clusters, sometimes containing as many as eight nuclei. There were a few rod cells and other cells of a pathologic type.

The blood vessels showed striking changes. Quite generally there was an active proliferation of the intimal cells, and newly formed vessels were not infrequently observed. In some of these latter there were cells which had the appearance and staining characteristics of plasma cells. They were, however, only rarely encountered and never were found outside of the channel of the vessel.

The right anterior central region showed such changes as these, but in addition presented a broad area in which nerve cells were absent to the depth of the third layer. The area was crowded with nuclei, most of which were of neuroglia cells, and surrounding the area were neuroglia cells with large bodies, such as occur in the

vicinity of softenings or inflammatory lesions of the cortex. There were no plasma cells found in this region. Nowhere was there any infiltration of the vessel walls.

The cord showed no meningitis or arteriosclerosis. There was an extensive degeneration of the pernicious anemia type in the dorsal columns extending from the lumbar to the cervical levels.

This was evidently one of old origin, as the area was densely filled in with neuroglia fibers and most of the fatty products of the degeneration lay outside of this area in cells crowding the vessel walls of the septa.

The lateral column showed an extensive and recent degeneration. It is not possible to exclude the occurrence of syphilis in this case, especially as the clinical course is reviewed in the light of the anatomical findings. The occurrence of corneal ulcer during life and the presence of the bone lesions in the skull are suggestive. Of more importance is the diffuse endarteritis present in the cortex and the finding of a rare plasma cell.

The cerebro-spinal fluid was not characteristic for syphilis, and the mental symptomatology was unusual for syphilis.

The occurrence of the pernicious anemia and the characteristic spinal cord lesions of this disease make the case one of importance for consideration in this connection.

**CASE 621.**—J. O., a male, had a father who died from tabes, and several members of his family were psychopathic.

As a child he was neuropathic and is said to have had hydrocephalus and been backward in learning to walk. In school he was not regarded as dull. At the age of 38 he complained of pains in his back and head. He was forgetful and had difficulty in fixing his attention; he became pessimistic and melancholy and spoke of a certain passage in the Scriptures as having a special significance for himself. He became suspicious and believed that people were following him and plotting against him. He, on one occasion, became angered with some painters working in a neighboring yard and shot at them. This brought about his commitment to the state hospital. There his physical condition was not impaired but his knee-jerks were exaggerated. He had some insight into his mental condition, and spoke of his symptoms as coming on gradually during the past few years. There were periods when he became, as he said, "much confused and wandered aimlessly about." He questioned the faithfulness of his wife. He had some expansive ideas which showed in a foolish scheme for organizing some public bath-houses. At times he had auditory and visual hallucination. His retentive memory was poor and he was forced to write down particular things he wished to remember.

His mood was generally one of mild elation. Episodes of slight confusion were occasionally noted. The delusions and hallucinations were no longer in the foreground, and after two months he returned to his home.

Five months later he voluntarily returned to the hospital, saying that for the past few weeks he had been more irritable and found it difficult to keep from getting into trouble with people who annoyed him. There had been several transitory episodes of confusion. During the following two years his condition varied, at times he would seek the hospital for treatment and then return to his home. At home he worked irregularly, in office employment he was insubordinate and a meddlesome mischief maker. He was mean and threatening toward his wife, and had no sense of moral obligations toward her or the children. He had expansive schemes which led him into foolish business ventures.

In 1907, at the age of 42, he was again in the hospital. There was nothing mentioned in his physical condition that would indicate an anemia. There was tremor of the tongue and fingers and the knee-jerks were exaggerated. There were no disturbances of sensibility. He was slow in his movements. His comprehension and orientation were undisturbed. In intellectual work he showed ordinary facility. There was a tendency to confabulation. He was still expansive in many of his ideas, proposing schemes altogether impractical. Aside from the suspicious attitude he held toward his wife there were no delusions now present.

For four years his condition continued rather stationary; the suspiciousness and expansiveness were at all times marked. His blood then gave the pathologic findings of pernicious anemia. The red cells ranged around 1,500,000, and the haemoglobin between 45 and 50 per cent. The cell findings were characteristic.

Several remissions in the severity of the anemia occurred and with these there was always an improvement in his mental condition.

Towards the last he became edematous; he was more irritable and showed extreme defects in judgment. Death occurred nine years after the first development of the mental symptoms, and one year after the anemia became evident.

In this case we have developing in a man who was from a psychopathic family and who was himself psychopathic a marked degree of suspiciousness, irritability, auditory and visual hallucinations, mild delusions of persecution, expansive mood and extravagant ideas, with episodes of confusion, memory impairment and confabulation. The condition showed marked variability and remissions in the prominence of the symptoms. At no time was there complete recovery; eight years after the beginning a pernicious anemia made itself evident and rapidly progressed until death.

The anatomical findings were of extreme interest, in that there were found in the cortex many focal lesions which in their histology seem to us quite the same as those which are present in the characteristic cord lesions, namely, small focal disintegrations of the myelin and an accumulation of epithelioid cells, actively phagocytic for the fatty products of the disintegration; around the area the neuroglia showed progressive reaction changes. There was no evidence of hemorrhage in any of these lesions. These varied in their appearance, as if of different ages; in some there were few epithelioid cells, but the area was densely filled in by neuroglia. The majority of these were in the white centers of the frontal convolutions. There were in addition small lesions in the deeper parts of the nerve cell layers of the cortex, which appeared as small focal areas of necrosis and accumulations of epithelioid cells. These did not seem to be associated with hemorrhage and resembled closely those found in the white substance.

Cytologic studies of the cortex showed an increase of the fibers of the marginal layer of glia, with numerous entangled coagulation products. The glia through the nerve cell layers showed a moderate relative increase, with pathologic amounts of pigment in the cell bodies. The nerve cells showed appearances which could not in the regions examined be regarded as pathologic. The blood vessels were much altered, they lacked the normal sharpness of outline; the intimal cells were often swollen and there were evidences of a mild endarteritis. The vessel walls were crowded with pathologic amounts of lipoid pigments.

The spinal cord in this case showed only one small myelitic focus present in one ventro-lateral column of a section through the upper sacral region. This was old in character, as there were few epithelioid cells present, and the area was filled in densely with neuroglia. Sections from other regions showed no degeneration whatever.

**CASE C. G.**—The antecedent family history is unknown. He was of moderate alcoholic habits.

At the age of 46 he suffered much from gastric disturbances and soon became very anemic. He became irritable and suspicious and accused his physicians of giving him medicine to cause his blood to dry up.

Shortly after the onset of the first mental symptoms he came into a hospital for the insane.

There he showed extreme paleness with yellowish skin, and extreme gastric tenderness.

The knee-jerks were absent and the arm reflexes exaggerated. He complained of feelings of numbness in his legs but objectively there was no abnormal reaction to tests for sensibility. The blood showed a severe anemia.

He was clear in his comprehension and orientation. He expressed delusions of suspicion and persecution, as "He was the victim of a conspiracy which had forced him into the hospital; a relative had influenced the physicians to drug him; his wife had changed in her attitude towards him and he accused her of putting poison in his food to get him out of the way." These ideas were not much systematized and were not firmly fixed, as he expressed it, "It seems as if this is so but I have no proof of it."

His gastric distress he knew was due to a cancer of the stomach and believed that he should be operated upon. There was a slight degree of expansiveness present. He believed that he should have a degree of attention not shown to others. A blood examination showed 717,600 red cells and 20 per cent of haemoglobin.

He refused to take his medicine, as he believed it was poison; an evidence of poisoning was that his bowels had moved after receiving a laxative. After he drank a glass of milk he had cramps from the poison that had been given in the milk.

There were auditory hallucinations: people on the ward said that "he would be better off if he were out of the way. The attendants said that they would fix him; voices outside of the building said we will do him, we will get him, we'll poison him." He refused to eat because of poison being placed in his food; he knew it was there because he could taste it.

The anemia and emaciation became extreme. There developed a severe diarrhoea with slight elevations of temperature. The delusions and hallucinations were present up to the end which came about five months after the onset of the mental symptoms.

It is to be regretted that the brain of this case was not available for study.

The cord showed an extensive and active degeneration of the dorsal, lateral and ventral columns.

The case shows the development of a paranoid condition, developing at about the same time as the anemia. There was an extreme irritability, suspiciousness, auditory hallucinations, delusions of reference and persecution. These were without marked systematization. The entire course was rapidly progressive.

In addition to the six cases whose course we have been able to follow to the end, we have been able to study two others from the Department of Internal Medicine in which the symptomatology showed many resemblances.

The cases, as a whole, have in common an irritability, and a suspiciousness which forms the ground on which develop the delusions of persecution. The content of the delusions is usually influenced by the somatic-neurologic symptoms and the situation in which the patient is placed as a result of these disturbances. In some instances there were auditory hallucinations to which the patient reacted with strong affect. In several cases there was confabulation, which suggested that seen in the Korsakow's symptom complex.

There was no marked deterioration present, the comprehension and orientation were usually clear, except for rare episodes, in which they were slightly disturbed. In two instances the mood was slightly expansive.

In a number of instances the course showed remission in the intensity of the symptoms and these corresponded to the remissions in the physical conditions. Underlying the development of the mental condition in all but one of these cases was a hereditary predisposition. In several instances there were a number of occurrences of mental abnormalities or insanity among the ancestors. In all cases of pernicious anemia with mental disorders that we have studied hereditary factors were found in the greater number.

As to the clinical position of these cases it would seem that they must be placed among the paranoid conditions which are symptomatic of a toxic-organic process affecting the central nervous system—analogous to the paranoid conditions which have been noted in tabes, alcoholism, and from certain drugs.

The study of the cortex in nine cases of mental disorder, in which pernicious anemia was found, showed distinct pathologic findings in eight. The structural changes were diffusely distributed, but in some instances showed greater focal intensity. The nerve cells were of normal appearance in only one instance. They were slightly altered in three and of more severe degree in four cases. In most instances the changes were moderate fatty degeneration, with disintegration of the chromophilic substance of the cell. In two instances the cells showed a reaction which follows an injury to its peripheral fiber process.

The neuroglia in most instances showed a diffuse increase, usually slight, but in two decidedly marked. The type of change was that of a moderate development of a cell body and the inclusion

of an unusual amount of disintegration products. The activity of the growth is evidenced by the occurrence in two cases of nuclei in mitosis and in the collection of nuclei in groups.

In addition there were in some instances abnormal types of cells which we are accustomed to regard as evidence of pathologic change in the interstitial elements.

The most constant alterations were in the blood vessels, which in most instances showed swelling of the intimal cells and in some active proliferative changes. Quite generally there were excessive amounts of disintegration products crowded in among the cells of the walls or immediately adjacent. These cell products gave reactions of fat and the amount of this was in direct relation to the severity of the changes in glia and nerve elements. In three cases there were recent focal hemorrhages.

Perhaps the most important findings in the present study are the focal lesions, which correspond in a very close degree to the lesion so characteristically present in the cord. (Figs. 1, 2, 3, 4.) These were found in three cases: once in a case of paranoid condition of six years' duration; once in a condition not to be differentiated from the depressed phase of manic-depressive insanity, and once in a case of mental deterioration of some 21 years' duration. These lesions in two instances only involved the white substance of the convolution and once both white and gray substance. The occurrence of lesions in any area of gray is very unusual in pernicious anemia. In this case they lay deep in the cortex where the myelinated fibers were abundant.

The occurrence of degenerations in the medulla was noticed in four of five cases studied. In two instances there were found focal myelitic degenerations and in two characteristic Marchi degenerations of the fibers of the intra-medullary part of the hypoglossal nerve and in one of these also the fiber passing into the raphe.

The changes, as a whole, are not of a specific type, but rather those which occur in conditions of chronic intoxication, and resemble those found in chronic alcoholism, namely, the occurrence of increased lipoid products in cells, glia overgrowth, vessel changes, miliary hemorrhages, and intra-medullary fiber degeneration.

The similarity to a toxic type is further shown in the axonal type of reaction which was found in two instances, a change which has

often been noticed in the Korsakow's symptom complex and various forms of toxic neuritic disorders. As in toxic processes the vessels are severely affected.

Clinically there are features in these paranoid cases which resemble closely those seen in chronic and subacute toxic conditions, especially the chronic alcoholic delusional states. These are the occurrence of the suspiciousness and irritability, the development of the delusions of persecution, the auditory hallucinations and occasional memory impairment and confabulation.

The cases apart from this paranoid group are difficult to interpret, as to the etiologic influences of the pernicious anemia, and whether or not the occurrence of pernicious anemia is anything more than incidental cannot be determined. They are, however, of importance in showing that the associated pathologic process was not one characteristic for any specific psychosis, while in some instances the anatomic lesion was of a characteristic pernicious anemic type.

In conclusion, it has been shown, first, that mental diseases may occur associated with pernicious anemia, which seem to be of more than incidental importance, and that these are not always of the usually described amentia type, but are more chronic and show resemblance to mental disorders symptomatic of toxic conditions.

Second, that pernicious anemia may be associated with pathologic changes in the cortex of the brain, which in their finer aspects are such as have been observed in mental disorders associated with toxic influences, and in addition specific lesions which resemble those occurring in the cord in pernicious anemia.

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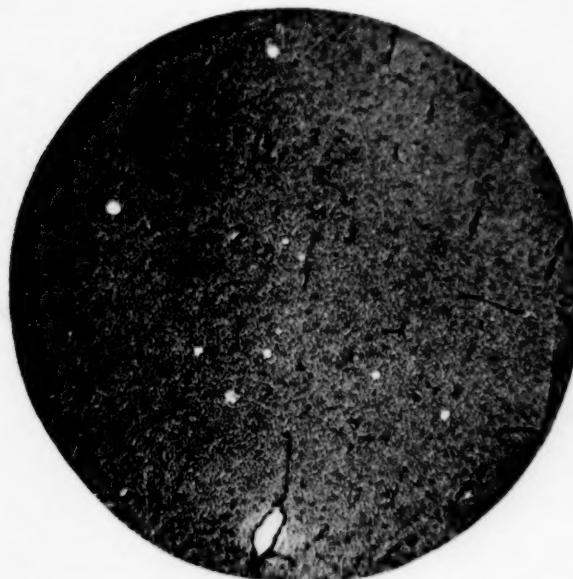


FIG. 1.—Pernicious Anemia: Multiple focal degeneration in subcortical white substance. Case 621. Van Gieson stain. Mag. 75.

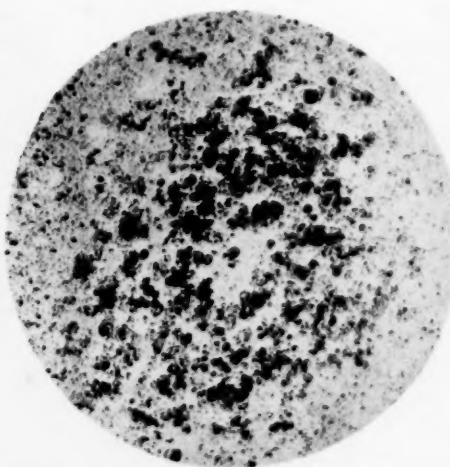


FIG. 2.—Pernicious Anemia: Focal area of fatty degeneration in subcortical white substance. Case 648. Herxheimer stain. Mag. 300.



AMERICAN JOURNAL OF INSANITY, Vol. LXIX, No. 5. PLATE XXVIII.



FIG. 3.—Pernicious Anemia: Focus of fibre degeneration and nuclear increase, in central white substance. Case 621. Pal-Weigert stain. Mag. 75.

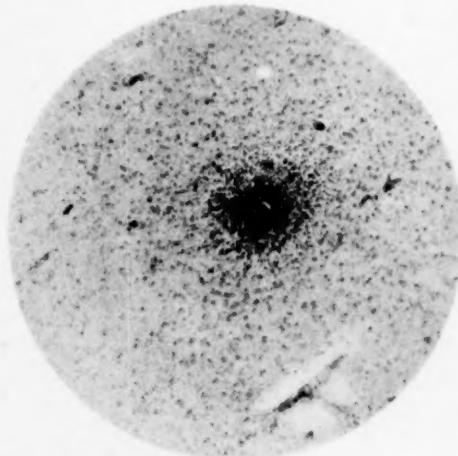


FIG. 4.—Pernicious Anemia: Perivascular nuclear increase in subcortical white substance. Case 621. Van Gieson stain. Mag. 75.



## CLOSING REMARKS.\*

By ADOLF MEYER.

My first thought in these my closing remarks of this memorable celebration is that of gratitude towards the man who made it possible for us to be here. The next thought is that of gratitude to you who have honored us with your presence and your discussions, some of you with great sacrifice of time and sacrifice on the part of your patients and your work. The dominant thought is and will always be how to make it as certain as possible that the activity of this clinic, so auspiciously inaugurated, shall grow and bring its best fruit in the great cause of mental health work.

The discussions of these three days were so planned as to give an expression of the leading principle for which this clinic is to stand. Instead of a series of eloquent orations on insanity and its study and treatment, we have heard a series of very concrete reports of intensive work and eloquent *facts*, indicative of the many lines of closely integrated issues and reactions we have to study and to learn to master. We find in the first place the general medical foundations as brought out by the studies of Dr. Cushing, Dr. Barrett, Dr. Dunlap and Dr. Rossi, and also by Dr. MacDougall; groups of facts and coordinations of inductions from neurology, and the various integrative factors of the nervous system; from the nervous system under the guidance or misguidance of the internal secretions, or under the effects of *diseases* of the internal organs as in pernicious anaemia and in the great nutrition disease pellagra, or under the influence of the minute *parasites* which continue to thrive because of our sham-morality and unwillingness to meet the sexual problem in the open. I say these lines were eloquent assertions of the share of general medicine in psychiatry, and their very extent shows how unlikely it is that we should ever come to distinguish sharply between a mind and body in our field, because after all, we face one large biological problem, the disorders and actual diseases of biological organisms and of

\* Address delivered at the opening exercises of the Henry Phipps Psychiatric Clinic, The Johns Hopkins Hospital, Baltimore, Md., April 16-18, 1913.

groups of organisms; and every one of the topics had to climb the ladder from the nerve-cells and tissue-cells to the reactions of the *individual as a whole*, which, for practical reasons, we call our mental life. It is therefore not in the spirit of a very great contrast, but of a sense of order, that I speak of a second line of eloquent orations, not of word only, but of facts worth assimilating and heeding, when I refer to a *second domain* we had before us: the more essentially *psychological level* which, in a way, takes the general medical foundations for granted, and turns directly to the reactions of the organism as a whole; a world of fact so rich in problems that it would be stultifying if we had to keep in evidence the details of histology and anatomy and general medicine except when we come to analyze special problems in the quest of detail interpretation, as Professor MacDougall has done, or in the quest of new *facts* in the great world of Nature's experiments, as was done by the workers mentioned in the first group of communications. Nothing could more fully than Professor Bleuler's address show what a broadening function psychology has developed in our field; a function of rich amplifications of facts and a mustering of these facts not as tin-soldiers of speculation, but as a big, pulsating and real live world which we must face and handle and which brings us new helps. Within this specialized level of integrations Dr. Wells has led us into the laboratory of scrupulously painstaking observation and discrimination. Professor Heilbronner has taken us over the most important ground of the estimate of the assets of our patients in states of dementia. Dr. Hoch has grouped types of assets in personalities and their relation to disease-groups and has thus led over to a *third chapter* or point of view, that of nosology and the intellectual and methodical apparatus of psychiatric discriminations of disease, *the organized apparatus of so-called "diagnosis"*: that form of reasoning still peculiar to medicine, under which the physician's logic has worked exclusively until a functional and experimental pathology made medical functions less and less mystical and less and less the product of guess and intuition, which used to be and still so often is sanctioned by the big word "diagnosis."

Professor Jones and Professor Kirby have given us vistas of how to keep order among the facts without neglect of the reconstructive methods. They give us excellent glimpses into the ways

of interrelation of the descriptive and analytical helps of interpretation and of mustering our facts so as to use them for action rather than for mere labelling.

Dr. Mott has taken us into a further field, viz.: the workshop of the great biological problems of heredity, and we shall briefly touch later still another field, that of the ramifications into the practical life in school, social work and the problems of the court, a line for which I had hoped to obtain a report from another European representative, who, however, could not accept our invitation.

Looking over this array of highly appreciated contributions and the wide range of suggestions emanating from them you will agree with me that there is no field so much in need of a firm anchoring in specific concrete work as psychiatry, but also no field so much in need of a broad grasp with *plastic principles*, which guarantee an *open mind* and *yet* firmness and decision of action and of interests.

There is no field which must aim at having as great a variety of temperaments among its corps of workers and at the same time a most judicious *balance* of diversity and specialization on the one hand and sane and broad common-sense principles on the other.

There is no field in which more people have thought they can solve all the problems by imagination and reiteration of hackneyed generalities, and no field in which the products of mere imagination, even of the best guessers, falls more hopelessly short of the reality. Psychiatry is a wide range of methods and problems of work to be *performed* and as little to be exhausted by talking as surgery or obstetrics or pathological anatomy. But the field is not simple. It appears vague to one who does not work in it, and an easy way to pass over what is difficult is often enough indifference or a derogatory remark about the methods and the field as a whole.

It may be that in psychiatry we shall always need to deal with matters which require an infinite amount of patience and of willingness to put up with far more relativity of results than most of the other domains of medicine. There might be something discouraging in this, but only to the lazy or to the one who believes in the false prophets of exclusive absolutism and cut-and-dried doctrines. Surgery requires its special temperaments, so does obstetrics and internal medicine; and certainly also psychopathology. But it is not merely an issue of temperament and personal capacities. The

last decade has also brought more concrete methods and objective facts within the reach of all than any previous period of psychiatry. Indeed, I feel that before long few physicians and students will escape the fascinating influence of the growing definiteness of the theoretical and practical problems which characterize the present phase of our science with its sane appeal to a broadened common-sense and more and more concrete points of attack.

There will in every class be students who want to take up the special kinds of problems and surely they cannot find a richer and more fascinating domain. I certainly venture to predict that, just as two or three decades ago neurology was the center of fascinating systematization, attracting some of the best minds of medicine, so this assertion in a fresh conception of the neurology of the highest integrative functions and the most vital business of man, to attend to the most efficient working of the functions of conduct and behavior and the mental adjustments, will attract a remarkable group of workers.

The recent observation of Noguchi, which at last brings an active, live element, the spirochaetes, into the center of general paralysis work, is a good instance of what is likely to happen. A fresh stab by an experimental worker helps us over a certain staleness of interest and a new chain of problems arises which no doubt will demand part of that patience which comes with the study of the long-drawn-out diseases. In a zigzag line of give and take we shall work along. To be able to grasp fixed points or crystallizing material in this fluid mass of facts will forever mark the pathfinder. May we hope that more and more of us may lay our hands on *more* than descriptive material; cull out some salient factors, perhaps more definite than disorders of internal secretions or either "habit" or "complex," the combinations of the two in some special disorders, or newly conceived dynamic units—and we shall have more and more valuable lines for the analytical and constructive work which constitutes true pathology.

When we take into consideration the ramifications of psychiatry into the schools, social work and the problems of legal conduct we may realize that indeed psychiatry is expected to bring a most important contribution to the rounding off of a medical education and to the very foundations of general culture.

Looking back over 20 years of work I feel that the first task, that of attaining sufficient average standards of psychiatric work, has been fairly well achieved. The next ten years will no doubt bring a further organization of standards, but mainly incidental to the development of much more clearly defined lines of specific issues.

The distinctive trend of American psychiatry lies in the sober attitude towards systematic nosology, and in the greater emphasis with which the practical aims are pushed into the foreground. It presents an essentially pragmatic attitude in the scientific program as well as in the vigorous effort at a practical and scientific understanding of the individual case. The whole fabric of social, civic and medical and scientific organization around us is characteristically freer than that of the old world, no doubt with many a drawback, but alive with opportunities peculiar to this country.

American psychiatry on the surface looks like reflections of the various promising movements of the most varied parts of the globe, yet without any sense for binding allegiance. One with even a superficial familiarity with its work readily sees the dominance of a fundamental confidence in common-sense and self-reliance, almost crushed out in many foreign schools.

Concisely put American psychiatry of the last ten years has clearly branched off from the descriptions and mere claims of analogies with aphasia or general paralysis, and from the faith in a quasi-exclusive salvation in pathological anatomy and nosology. It has assumed the justification of dynamic conceptions even in the mental life. It has reintegrated what was arbitrarily and schoolastically split under the emphasis of psychophysical parallelism; it has described some of the mental disorders in terms of habit and instinct disorganizations and instinct conflicts. It first pinned down the habit tendencies and their disorders; then it gave due attention to the experiences which shape habits and trends. About that time a most helpful concreteness was brought in in the recognition of the so-called complexes of the Zurich school, and the formulation of certain concepts of Freud's studies (wishfulfilment and repression); and the next step was the assimilation of the nature and import of symbolic mentation. We may lay claims to a fairly broad capacity for readjustments in this rapidly-growing development, if you consider that, over the general tendency in

favor of psychogenic interpretation, the histopathology of the nervous system and the studies of internal secretions and the chemistry of the brain and experimental pathology in the sense of the Hodge-Crile school have been far from being neglected.

A country in which the so-called "brain-spot theory" and the "mind-twist theory" can coexist each for what it is worth in the concrete case at the moment, or in special types of work; a country in which an anatomical, a functional, and a more or less psychodynamic standpoint are represented under nearly every roof in active hospital work; a country in which apparent aversion to the excessive social organization of the old world has forced the call for some of the best efforts at *practical* social work—such a country has its own possibilities, its own pitfalls, and in the main a vigorous optimism and yet a keen eye for mere sham-display. What other country could give us the peculiar gushes of independence and determined and energetic practical experiments so characteristic in the Jamesian emancipation in psychology, in Watson's appeal for the behaviorist's standpoint, in the eugenics movements of Davenport and Goddard, in the mechanistic formulations of Loeb and Herter, and in the equally strong *functionalism* in our own field?

The freedom and latitude of our methods naturally involve also very great risks. There is not among us the in many ways admirable discipline which turns out the stately numbers of Schülerarbeiten and dissertations, and papers for habilitation. The tendency is in the direction of more or less well-circumscribed issues, pushed with a great deal of free energy. Men of encyclopædic knowledge and capacity are and will be rare; but schools with many-sided representations of work will have to take their place. The American preparatory college, if any educational institution on earth, deserves the connotation of the Greek word for school; it is a place where leisure in the best sense of the word is considered a virtue—the training for the *proper* kind of leisure on the one hand, and the training for the concrete duties and an aversion against feeling too closely wedded to any single pursuit.

These are sound Anglo-Saxon and American characteristics which will be bound to find their rewards and returns in this marvelous boiling-pot of nationalities. Safer grounding in the fundamentals without excessive grind, mastery without iron-cast

frames, less and less even of the hide-bound, and a wholesome amount of the right type of active leisure—these are conditions for which we look. Safety in a firm and reasonable grasp of actual resources of experimental work with a sufficient systematization of the best available knowledge in each fundamental science will do more than the sham perfection of examinations aimed at in the passing scholastic ideals. Our growth will depend on the cultivation and proper organization of leisure and on the practical contact with the many chances for work and experience.

Psychiatry in this country has a wonderful field important not only to the victim of disease but to all thoughtful people. It will have to furnish many facts for the experience on which we can build the elements of real culture. As soon as psychiatry enters upon the disorders below the arbitrary level of declared insanity; as soon as it pays attention to what has quite unnecessarily been left to untrained teachers; as soon as we become helpful in schools, in teaching how to shape mental life effectively, how to make the most of an individual's endowment instead of destroying much by attempting the impossible; as soon as we make our field a matter of obligatory study to the psychologist and create outlooks on the cultural benefits of psychiatry, the world will find psychiatry less like an initiation into a dark corner of human life, but more and more a broadener of common sense.

Mr. Phipps has given us a wonderful start for the development of a nucleus of concrete work. Even the physical construction of the building expresses the recognition of a diversity of fields: the outpatient department with the social work; the clinical services with their subdivisions suited for a wide range of conditions; the department of internal medicine with its laboratory; the future departments of neuropathology and psychology. Work with the local physicians, the special institutions in the state, the schools, social workers, and the courts of definite districts must round off the field on which we want to carry on work, forming a worthy ground of practice and assimilation for student and postgraduate student, and the only fit basis of research. Work on cases with mental disorders demands a willingness to consider many aspects, and this means a training in practical and intellectual discipline, such as is required by few other branches of medicine, to consider complexity and yet to do justice to the integrated parts and vice versa.

This is the simple practical ground on which we launch our work. Mr. Grosvenor Atterbury, an excellent and resourceful architect, Dr. Winford Smith, a most helpful co-worker in the administrative organization, Miss Taylor, the untiring organizer of the nursing work and of the housekeeping, and the unfailing help of many friends and associates, have made it possible to give shape to what I trust is good elemental autistic thinking adapted to reality.

I have not realized until these days of the opening how strongly I feel that at last another vital step, not merely in my career, but in my hopes for psychiatry, is achieved. The work of preparation and the many matters of solicitude in the shaping of the responsible task, the apparent impossibility to bring home some of the actual needs of such an institution, the many uncertainties and the stern necessities of adaptation at every step, all that kept one wrapped up as the forest does as one climbs through the dense woods of a mountain slope until all of a sudden one reaches a fine open cliff on a height with a chance to look over the plains and the slopes conquered, and a usually very deceptive view of the heights yet to be climbed. A moment's rest and again one delves into the woods on and up, until the camping ground is reached, to prepare for the further climbs.

There are many parallels in this simile. The climber sees ahead through the bush; he thinks he sees a top only to see another one beyond. Who has not had the experience? And who does not know the sensation of eagerness to conquer and the unbearableness of having to camp before the goal is reached?

To-day we have reached a camp, not to rest but to work with all our energy, to recruit a body of workers, to convince those on whom we depend that our ideals were capable of taking good shape in the world of reality, and to make more people yearn and work for that which has been growing slowly and safely and will, I hope, never cease growing.

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